A TEACHER TRAINING

Human Values in
Water, Sanitation and Hygiene Education

guide for africa

UN-HABITAT

THE AFRICAN INSTITUTE OF SATHYA SAI EDUCATION

HUMAN EXCELLENCE

PREFACE

Rapid urbanisation has put enormous pressures not only on water resources for safe drinking water, but also for safe sanitation, improved health and hygiene practices. The increasing health hazards and pollution from water and sanitation related diseases are threatening the eco-systems. There has been a growing recognition that improvements in water and sanitation management can not be accomplished alone by technical and regulatory measures but also to be complemented by advocacy, awareness and education initiatives. New thinking, bold and innovative strategies are required in succeeding to achieve the Millennium Development Goal (MDG) on water and sanitation.

The situation could be reversed if the fundamental change in behaviour and personal attitudes and the underlying values that prompt such inappropriate behaviour, are properly understood. Human Values based Water, Sanitation and Hygiene Education (HVWSHE) is an innovative approach to education that facilitate changes in behaviour and personal attitudes among water consumers and promote better understanding of the environment. HVWSHE plays a strategic role in bringing about positive attitudinal changes, promote hygienic living and use of water in a wise and sustainable manner. This needs for developing capacities in schools, teacher training colleges and communities to optimise human potential and empowerment.

UN-HABITAT, under the Water for African Cities (WAC) Programme, has been implementing Values-based Water Education (VBWE) in six countries and has proved to be a path-breaking and innovative education initiative. Under its Phase II development, there is a shift from VBWE to HVWSHE for a broader perspective, covering twelve countries in West, Central, East and Southern Africa. UN-HABITAT is cooperating with The African Institute of Sathya Sai Education (TAISSE) of Zambia, a non-governmental organisation specialised in promoting HVWSHE, with the objective of creating a new ethic among children and community through water, sanitation and hygiene education.

The publication is prepared in cooperation with TAISSE, which facilitates as a Resource Book for Trainers of Trainers to undertake country level training. It is intended to build the capacities of the Trainers, Educators, School and College Tutors, officials of the Education Departments, Non-governmental organisations in implementing the phase II operations of the education component of the WAC programme.

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Contents

Purpose and Outcomes of this Training Guide

Over the past three years, UN-HABITAT has been implementing Values-based Water Education (VBWE) in six demonstration countries as part of its Water for African Cities Programme (WAC). With support from the Swedish International Development Agency (SIDA) and The African Institute of Sathya Sai Education (TAISSE), the water education programme has proved itself as a truly path-breaking and innovative education initiative in Africa. The initiative is part of UN-HABITAT's support to African countries in the development of a new ethic for water governance in cities. The countries that are participating in this programme include: Burkina Faso, Cameroon, Cote d'Ivoire, Ethiopia, Ghana, Kenya, Mali, Niger, Senegal, Tanzania, Uganda and Zambia.

Rapid urbanisation has put enormous pressure on water resources. The growing numbers of urban residents, especially the urban poor, pay an increasingly high price for the lack of safe water and adequate sanitation. They endure an increasing health burden from water related diseases resulting from unsafe water, inadequate sanitation and hygiene. In addition to higher health burdens, the poor too often pay much more for inferior water and sanitation services than their wealthier neighbours. Increasing volume of wastes generated by the cities are also polluting freshwater bodies and threatening the eco-systems. There is a growing recognition that improvements in water management cannot be accomplished by technical or regulatory measures alone. These would have to be complemented by advocacy, awareness and education initiatives.

Under its Phase 2 development, there is a shift from Values based Water Education to Human Values based Water, Sanitation and Hygiene Education (HVWSHE), which aims at facilitating changes in behaviour and personal attitudes among water consumers and to promote better understanding of the environment in a water context. There is a growing understanding that only a fundamental change in behaviour and personal attitudes, and the underlying values that prompt such inappropriate behaviour, can reverse this situation. Water, sanitation and hygiene education can play a strategic role in bringing about positive attitudinal changes, and in the longer term, can help develop a new water-use ethic in society. To achieve this, it is important to develop capacity in schools, teacher training colleges and communities in order to optimise human potential, thereby empowering individuals to:

- Develop an awareness amongst boys and girls of water-related environmental issues;
- Gain knowledge, insight, and skills necessary to analyse the issues and understand why men and women, boys and girls view and use water in the environment in particular ways;
- Examine attitudes, values, and behaviours in a gender sensitive manner regarding water, sanitation and hygiene in communities within each city;
- Identify the underlying causes of water, sanitation and hygiene oriented problems, presently in the city;
- Support informed decision-making by the community that could affect the quality of their lives with respect to water, sanitation and hygiene;
- Participate actively in the sustainable management of their environment in the water context; and
- Evaluate and propose actions that will achieve effective water related solutions in support of water conservation.

This training guide is intended to build the capacity of trainers, educators, college tutors, department of education officials and non-governmental organisation agencies to implement Phase 2 of the education component of the WAC Programme. Specifically this guide was developed as a resource for Trainers of Trainers (ToTs) to use and to undertake country level training in HVWSHE. The purpose of this guide is to:

- Share knowledge, skills and attitudes relating to Values-Based Water, Sanitation and Hygiene Education;
- Build capacity of ToTs to undertake country training; and
- Familiarise ToTs with the strategy and methodology that will be used to implement Phase 2 of HVWSHE.

The following outcomes are envisaged for ToTs and participants using this guide:

- Enhanced understanding of water, sanitation and hygiene challenges in urban areas;
- Understanding of the Conceptual framework of Human Values in Water, Sanitation and Hygiene Education;
- Internalisation of the philosophy and methodology of Human Values Education;
- Development of skills, strategies and tools to implement the new water, sanitation and hygiene ethic that is based on human values; and
- Development of a programme strategy for schools, teacher training colleges and communities.

How to use this Training Guide

This training guide* consists of the following 10 modules. The time that should be devoted to each module is given in brackets.

Module 1:	Concept of Values Based Water, Sanitation and Hygiene Education (1/2 day)
Module 2:	Water, Sanitation and Hygiene Challenges in Urban Areas (1/2 day)
Module 3:	Practical Knowledge on Water and Sanitation (1/2 day)
Module 4:	Creating New Water, Sanitation and Hygiene Ethic (1 day)
Module 5:	Human Values Education in Practice: Philosophical and Pedagogical Backgrounds (2 days)
Module 6:	Principles of Monitoring and Evaluation using Results Based Management (1 day)
Module 7:	Programme Strategy Development for HVWSHE in Curriculum and Teacher Training Colleges (1 day)
Module 8:	Programme Strategy Development for HVWSHE in Schools (1 day)
Module 9:	Programme Strategy Development for HVWSHE Community Outreach (1 day)
Module 10:	Tips and Tricks for Conducting Training Workshops (1/2 day)

Each of the modules in turn is divided into several units. Each module consists of:

- an overview and brief description;
- the aims and outcomes of the module;
- the number of units and the content that is covered;
- the activities that are undertaken; and
- a list of references and website links.

* As this is a generic training guide, facilitators must adapt the material to suit local conditions

Tips for Facilitators

It is very important that this guide is facilitated in such a way that it models good facilitation skills.

These include:

- Believing that participants have valuable and important contributions to make;
- Always being prepared to learn from participants;
- Recognising a partnership with participants in the learning process. This means being aware of not speaking too much or dominating the proceedings;
- Understanding adult learning. Most people learn better when their contribution is acknowledged. Rather than by listening to another person and speaking, most adults learn better when they are given the opportunity to explore, discuss and practice; and
- Building a reputation for professionalism. This means being punctual, well prepared and impartial.

Ice Breakers and Energisers

Ice breakers are a great way to begin a workshop. Most people are nervous especially when they are attending a workshop where there are unfamiliar people. Ice breakers help people to integrate and socialise. They help to relax participants, and that makes them more receptive to listening and contributing. An ice breaker can also serve to build team atmosphere and to generate enthusiasm. Ice breakers can be fun, amusing, humorous, thoughtful, surprising or just plain silly. The most popular are games that have participants reveal something personal about themselves, or which encourage participants to get to know each other personally. The idea is that more than just having fun, the ice breaker will truly help to create group cohesion based on trust and understanding.

One of the tricks of an icebreaker is timing. It should not be too long otherwise the serious work of the meeting will not be given enough time. It should not be so short that those participants feel it was a token exercise. Timing also depends on the size of the group, the overall length of the workshop, and the purpose of the workshop. Here are a few ideas for you to try:

Games

Who likes what?

- Have everyone write on a piece of paper their name and answers to these questions: What is your favourite food, animal, TV show, hobby, and colour? Write your name. Don't let anyone else see the answers. The facilitator then reads the answers to the whole group, and members try to guess whom each set of answers belongs to.

Finding the perfect match

- Give each person a list of 5 to 10 traits that they must find in common with the people around them. Sample items could be: "Find someone that was born in the same month", "...someone who lives in the same district ", "favourite food is the same as yours", "loves the same type of music that you like"; "favourite TV programme is the same as yours", "has read the same book that you have read recently", or "drives the same model of car". The first person that finds a perfect match is declared a winner.

Guess the lie

- Have participants say 3 things about themselves - 2 true and 1 lie, others guess what the lie is.

Food for Thought

- To get to know participants and to help them get to know one another, have each participant state his or her name and a favourite food, vegetable or fruit that begins with the same first letter as the name. For example: "Hi, my name is Yusuf and I like Yams." As each participant introduces himself or herself, he or she must repeat the names and favourite foods of the participants who came before. Watch out — it gets tricky for the last person who has to recite all the names and foods!

Stringing Conversation Together

- Cut string or wool into pieces of different lengths. Each piece should have a matching piece of the same length (in other words there should be two pieces that are of equal length). There should be enough pieces so that each participant will have one. Then give each participant one piece of string, and challenge each participant to find the other participant who has a string of the same length. After participants find their matches, they can take turns introducing themselves to one another. You can provide a list of questions to help participants "break the ice," or participants can come up with their own. You might extend the activity by having each participant introduce his or her partner to the class.

Energisers

When energy levels are low and you suspect that the participants are not concentrating, it may be an opportune moment to use an energiser to get them recharged. This normally happens after long sessions and especially after lunch. Here are a few energisers that you could use.

Animal Groups

This energiser is a novel way of assigning people to groups. Give each participant a slip of paper with the name of an animal on it. Then give instructions for the activity to the participants: They must locate the other members of their animal group by imitating that animal's sound only. No talking is allowed – they must make the sound of the animal they have been assigned. The participants might hesitate initially, but that hesitation soon gives way to a cacophony of sound as they moo, snort, and giggle their way into groups. The end result is that participants have found their way into groups for an activity, and the initial barriers to good teamwork have already been broken.

A Tangled Web

Gather participants in a circle. Hold a large ball of wool or string. Start by telling the participants something about yourself. Then roll the ball of string to a participant without letting go of the end of the string. The participant who gets the ball of string tells his or her name and something good about himself or herself. Then the participant rolls the string to somebody else, holding on to the strand of string. Soon participants have created a giant web. Start a discussion of how this activity relates to the idea of teamwork — for example, the participants need to work together and not let others down. To drive home your point about teamwork, have one participant drop his or her strand of string; that will demonstrate to participants how the web weakens if the group isn't working together.

Developing Workshop Values

One way of establishing workshop ground rules is to give the participants an opportunity to identify human values which will create a positive and harmonious climate, contributing to a successful workshop. Ask the participants to identify values which they would like to see being practiced in the workshop. List these values on a chart paper and refer to these values at appropriate moments to remind participants of the values that they have agreed to subscribe to.

Displaying the following icons will help to remind the participants of punctuality and cell phone usage:

Sticking to Time
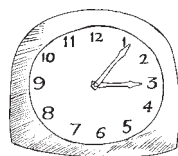
Plan your daily schedule well and put the programme on the wall of the venue to help you. It is useful if you let your co-facilitator help you to stick to time.

Groupwork

It is important that the facilitator is active during group work. Walk around and check that everybody understands and does what they should be doing. Guide and warn groups about how much time they have got to complete their task. Encourage slower groups and challenge the faster groups.

It is useful to change the composition of groups at least twice a day. It keeps people on their toes and moves them out of their comfort zones.

Please make sure you follow the icons that indicate what type of facilitation is required.

Setting Up the Venue

A carefully set-up and clean venue feels welcoming and shows participants that their time and effort are respected. It also helps to create a positive attitude and encourages co-operation from participants. If you use group work, have tables and chairs ready in such a way that no one has to sit with their back to the facilitator. Also check that there is enough space between desks and tables for you to move around comfortably. During breaks and at the end of the day it is a good idea to clean up the venue so that it feels fresh again.

A Venue Checklist

Before the workshop you might want to do a venue checklist:

- Is the venue clean and tidy?
- Could I make the venue look more inviting?
- Is there enough light and ventilation?
- Are there enough tables and chairs?
- Do I need a registration table?
- Will participants be able to concentrate in this venue?
- Is there enough space to move between tables?
- Are there enough toilets and are they clean?
- Is there toilet paper?
- Is the area for the catering set up?
- Is there water?
- Do we need a microphone or will everyone be able to hear?

Pre-Workshop Preparation

The TAISSE Country Co-ordinator must prepare a presentation on how s/he undertook the curriculum review process. This presentation is required for Module 7 Unit 1.

Invite a few members of the Curriculum Development Unit to serve on a panel and to make short presentations (not more than 10 minutes each) on how Human Values in Water, Sanitation and Hygiene Education can be mainstreamed into the curriculum of the demonstration schools.

Evaluation

It is essential that the participants provide feedback to the organisers and facilitators to improve the workshop and to assess how successful the workshop was. A mid-term and final evaluation will yield valuable information.

Here is an example of a workshop evaluation that could be used.

Human Values in Water, Sanitation and Hygiene Education

Arusha, 4-15 July 2005

Workshop Evaluation Form

Please give us your evaluation, suggestions and constructive criticism to help us improve future workshops

Rating Scale
1 = well below expectations/unacceptable
2 = below standard
3 = acceptable
4 = good
5 = excellent/outstanding

No	Aspect	1	2	3	4	5
1. 1.1 1.2 1.3 1.4	**Programme Content** How relevant was the programme content? Was the content of the workshop interesting and useful? Were the objectives of the workshop made clear? Were these objectives achieved?					
2. 2.1 2.2	**Interaction With and Within The Group** Was there sufficient interaction – questions, discussions & activities? Was there sufficient interaction among participants?					
3 3.1 3.2 3.3	**Understanding Subject Matter** Did the facilitator/s understand the subject matter? Do you understand the various modules? Were the materials and documents user-friendly, informative and helpful?					
4. 4.1	**Presentation and Facilitation Skills** Please rate the overall presentation skills of the facilitators a. b. c. d. e. f. Comments on presentation and facilitation skills					
5. 5.1	**Overall Evaluation** What is your overall rating of the workshop?					

6. What did you like most about the workshop?

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7. What can be improved upon?

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8. What further training/support would you like?

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Thank you for your time

List of Icons

The following icons are used in this Training Guide to draw your attention to the action that is required during the facilitation process.

	Individual activity
	Paired activity
	Group activity
	Report back
	Reflection
	Written activity
	Read this section
	Requires action
	Notes to the facilitator
	Discussion

After sharing the objectives of the training workshop with the participants, you may seek their commitment to the programme by asking them to pledge their support and commitment to the workshop.

Participants' Pledge

One way of reminding the participants of the reason they are attending the workshop is to get them to make a pledge at the beginning of the workshop. The facilitator may say something like, "Our coming together is to serve a noble purpose. Let us recognise it as such by taking a pledge and making some promises to ensure that our workshop is a success."

Pledge

"We have ALL committed ourselves to work with our schools, colleges of education and communities to achieve the Millennium Development Goal in Water and Sanitation. We have gathered here today because we want to DO something, we want to ACT to promote change so that we can achieve our vision of providing water and sanitation facilities. Water is Life, Sanitation is Dignity."

Promises

Let's…

- clear our thoughts. While we are together at this workshop let us be present in body and in spirit and let us involve ourselves fully in the tasks;
- decide to contribute and share openly and respectfully so that others can share and be open with us;
- keep our school, college and community clearly in mind. The workshop aims to change for the better, what we think is possible and real for our environment;
- decide that we will learn something useful from this workshop;
- decide to be active listeners. Let's listen to the thoughts, ideas and perceptions of others, this will enable all of us to benefit greatly from the experience;
- understand that we will take the role of both educators and learners at the workshop;
- share the dialogue of the workshop with others, expand the community and build networks of active learning communities; and
- enjoy ourselves! It is an opportunity to come together to work together and to learn together for a common shared purpose. By participating fully in this workshop and beyond we will realise the joy of working together and the creative energy that it stimulates so that by the end, we want only to celebrate.

Module 1

Concept of Values-based Water, Sanitation and Hygiene Education

1. Introduction

The challenges in water and sanitation for urban dwellers in African Cities are a huge concern. In order to meet the Millennium Development Goal for water and sanitation, UN-HABITAT embarked on an innovative approach to alleviate the plight of the urban poor. Through the Human Values in Water, Sanitation and Hygiene Education Programme it is expected that a new ethic would be created and that attitudes and behaviours would change. A systemic approach linking the school, the community, community based organisations, non-governmental organisations and government ministries will foster partnerships that will lead to models of excellence.

Aims of the Module

The intention of this module is to give the participants an overview of the HVWSHE programme as well as share the conceptual framework of the programme.

Learning Outcomes

On completion of this module the participants should be able to:

- Understand the background and rationale for HVWSHE;
- Understand the key issues on HVWSHE; and
- Appreciate need to address water, sanitation and hygiene in education.

Methodology

Unit 1

- Overview, challenges, solutions and concepts of value-based approach to HVWSHE.

Unit 2

Activity
Analysis of the opportunities, risks and challenges to mainstream HVWSHE in curriculum; identification of core values and related values and their application to the area of water and sanitation.

- Group work + reporting back in plenary; and
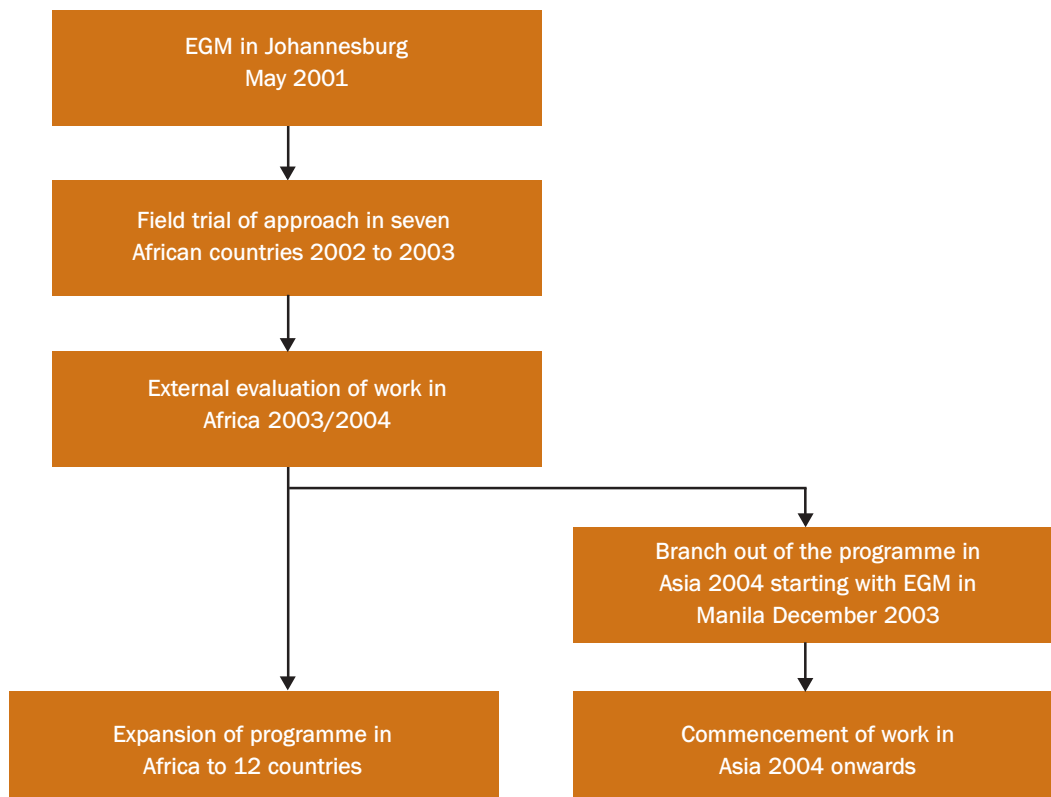- Discussion.

1.1
Introduction

There is a compelling case for creating a new water-use ethic in our cities. Rapid urbanisation has put enormous pressure on water resources. The growing numbers of urban residents, especially the urban poor, pay an increasingly high price for the lack of safe water and adequate sanitation. They endure an increasing health burden from water related diseases, resulting from unsafe water, inadequate sanitation and hygiene. In addition to higher health burdens, the poor all too often pay much more for inferior water and sanitation services than their wealthier neighbours. There is a growing recognition that improvements in water management cannot be accomplished by technical or regulatory measures alone. These would have to be complemented by advocacy, awareness and education initiatives.

Water education is a strategic entry point for bringing about positive attitudinal changes among both service providers and users. There is a growing understanding that only a fundamental change in behaviour and personal attitudes, and the underlying values that prompt such inappropriate behaviour, can reverse this situation. Water, sanitation and hygiene education can play a strategic role in bringing about positive attitudinal changes, and in the longer term, can help develop a new water-use ethic in society. Children and youth could be the best ambassadors to bring about these attitudinal changes.

1.2
What is Water, Sanitation and Hygiene Education?

Water, Sanitation and Hygiene Education is a process in which individuals gain awareness of their living environment and acquire knowledge, skills, values and experiences, and also the determination, which will enable them to act – individually and collectively – to solve present and future water, sanitation and hygiene related problems.

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│   EGM in Johannesburg       │
│   May 2001                  │
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              │
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┌─────────────────────────────┐
│  Field trial of approach in │
│  seven African countries    │
│  2002 to 2003               │
└─────────────────────────────┘
              │
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┌─────────────────────────────┐
│  External evaluation of     │
│  work in Africa 2003/2004   │
└─────────────────────────────┘
        │            │
        │            ▼
        │   ┌──────────────────────────────┐
        │   │ Branch out of the programme  │
        │   │ in Asia 2004 starting with   │
        │   │ EGM in Manila December 2003  │
        │   └──────────────────────────────┘
        ▼            ▼
┌──────────────────┐ ┌──────────────────────┐
│ Expansion of     │ │ Commencement of work │
│ programme in     │ │ in Asia 2004 onwards │
│ Africa to 12     │ │                      │
│ countries        │ │                      │
└──────────────────┘ └──────────────────────┘
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It is a learning process, that increases people's knowledge and awareness about water, sanitation and hygiene and associated challenges. It develops the necessary skills and expertise to address the challenges, and fosters attitudes, motivation, and commitments to make informed decisions.

Properly understood, it should constitute a comprehensive lifelong education, one that is responsive to changes in a rapidly changing world. It should prepare the individual for life through the understanding of the major problems of the contemporary world vis-à-vis water, sanitation and hygiene, and the provision of skills and attitudes that are needed to play a productive role towards improving living conditions and protecting the living environment with due regard given to ethical values.

1.3
Expert Group Meeting Johannesburg

In May 2001, under the auspices of UN-HABITAT, an International Expert Group met in Johannesburg, South Africa, to share experiences of ongoing water education initiatives and develop a strategy for introducing water education in cities. An important outcome of the EGM was the consensus recommendation to pursue a value-based approach to introducing water education.

1.4
HVWSHE Approach

HVWSHE seeks to impart information on water, sanitation and hygiene and also inspires and motivates learners to change their behaviour and adopt attitudes that promote hygienic living and wise and sustainable use of water. Its advantages include the following:

- it does not add further to the current overload of the curriculum, as it can be integrated with ease into the existing curriculum;
- it creates a lasting impact through character development, when understood, appreciated and practiced by children and young adults; and
- it is a proven approach in current practice world-wide, well documented and evaluated by experts in different parts of the world.

2. Concepts of HVWSHE

HVWSHE Concepts are developed from the perspectives of:

- The Education Sector;
- The Water and Sanitation Sector; and
- Human Values in Water and Sanitation Sector.

2.1
The Education Sector

Values Education
Values education is an explicit attempt to teach about values and/or valuing. Values education approaches include the inculcation of moral development and analysis with the purpose of instilling certain values in students and help them develop a higher set of values.

Values-based education lays emphasis on those qualities of a human being which are desirable, respected, esteemed, and help in making informed choices sanctioned by a given society. Realising the importance of values education, many countries around the world have taken initiatives for developing sets of values for education. Thailand has incorporated Values in the national curriculum. Australia has just published a National Framework for Values Education in Australian Schools (2005) and New Zealand has been promoting values education in the curriculum. South Africa has embarked on an initiative on Values, Education and Democracy.

2.2
The Water and Sanitation Sector

Values of Water and Sanitation
The Ministerial Forum at the 2nd World Water Forum held in The Hague proclaimed that water needs to be managed in a way that it reflects its economic, social, environmental and cultural values for all its users.

Life-giving Value
Unfortunately millions of children die annually from preventable water and sanitation related diseases in developing countries. Reliable water and sanitation services are far from universally available despite water being a basic human right.

Social & Economic Value
Water and sanitation is central to socio-economic development and poverty alleviation. Water has an economic value due to its contributions to economic activities including agriculture, energy generation and industries. Water also receives and carries away waste.

Value to ecosystem
Water gives irreplaceable services to the ecosystem like sustaining human and other life by way of producing food, decomposing organic waste, absorbing human and industrial wastes and converting them to beneficial uses.

Cultural and Spiritual Values
These values are integral to any society and are intertwined with the cultural and spiritual aspects of life.

2.3
Human Values

Human Values are fundamental to human existence. They are universal and inherent in all human beings and are found in varying degrees in all societies, religious traditions and civilisations. Human Values-based education, therefore, is complimentary to Values-based education.

Bringing out and nurturing of the human values in the children during the formative years will result in caring and responsible adults in the future.

There are five core human values: Truth, Right Conduct, Love, Peace and Non-violence. Different societies have different socio--cultural and value orientations. The water, sanitation and hygiene education initiative has taken these into account through active participation by countries involved.

Three main approaches are used for teaching Human Values-based Water, Sanitation and Hygiene Education. These include: the Direct Method; Integrated Method for the Curriculum (Formal Education); Integrated Method for Co-curricular activities (Non-Formal and Informal Education).

The Task Force on Water and Sanitation of the United Nations Millennium Project in its final report has identified Human Values and Human Rights, the basis for meeting the internationally agreed targets on water and sanitation.

3. About the programme

3.1
Overall Objective

- The creation of a new water-use ethic through Value-Based water education by imparting information on water, sanitation and hygiene and also inspiring and motivating learners to change their behaviour with a view to promote wise and sustainable use of water and sanitation.

UN-HABITAT has implemented a Values-Based Water, Sanitation and Hygiene Education programme in African countries for the past three years as part of the Water for African Cities Programme. The initiative is part of UN-HABITAT's support to African countries in the development of a new ethic for water governance in cities. It is unfortunate that over 50 per cent of water abstracted and treated at a high cost is wasted due to leakage and profligate use in many African cities.

3.2
Programme Priorities

A Value-Based Water Education Programme focuses on:

- Enhancing awareness and political will for HVWSHE in cities;
- Building capacity to conduct HVWSHE in the formal and non-formal education sector;
- Building partnerships between the education and water sector;
- Twinning of schools within countries and among countries within the region and among schools in the North and the South;
- Promoting investments for water and sanitation in schools; and
- Promoting ICT enhanced water education partnerships.

3.3
Activities

The activities can be summarised as:

- Enhancing awareness and political will for Human Values in Water, Sanitation and Hygiene in African and Asian Cities;

- Building capacity to conduct Human Values-based Water, Sanitation and Hygiene Education in the formal and non-formal education sector through;
- Promoting Human Values-based Water, Sanitation and Hygiene Education through the curriculum;
- Developing Resource Materials for Curriculum;
- Conducting training in Teacher's Training Colleges and selected schools;
- Developing Teacher Training Guides for use in Teacher Training Colleges and Schools;
- Demonstrating Human Value-Based Water, Sanitation and Hygiene Education in selected pilot schools and surrounding communities;
- Developing resource material and pilot demonstration of Human Values-based Water, Sanitation and Hygiene Education for the non-formal Education Sector;
- Developing partnerships with the Water and Sanitation Service Sector for increased and sustainable Water and Sanitation Service provision to schools;
- Building capacity for promoting Ethics and Human Values at the workplace, especially schools;
- Building capacity in the Water and Sanitation Service Sector to conduct Human Values in Water, Sanitation and Hygiene promotion and providing sustainable access to Water and Sanitation Services for schools and surrounding communities;
- Building capacity in Utilities for Human Values in Water, Sanitation and Hygiene Classroom;
- Promoting Human Values in Water, Sanitation and Hygiene Classroom through Water and Sanitation utilities;
- Developing Resource Guides for Human Values in Water, Sanitation and Hygiene Classroom for utilities;
- Conducting training for utilities on Human Values-based Water, Sanitation and Hygiene Classroom;
- Facilitate the establishment of Human Value-based Water, Sanitation and Hygiene Classroom;
- Building capacity in Utilities to sustainably provide Water and Sanitation services to Schools;
- Developing partnerships with the Education Sector and other relevant stakeholders aimed at promoting Water and Sanitation Services to schools;

- Assessing Water and Sanitation situation in both formal and non-formal schools; and
- Developing a strategy and investment programme for re-habilitation and/or provision of Water and Sanitation facilities to schools at risk.

3.4
Achievement in Phase 1

- Consensus on water-related environmental education strategy for African cities. The approach is suited to Africa, as it does not demand heavy investments in infrastructure;
- Water utilities, in particular, have realised that water education is a valuable tool in improving both their service delivery and customer/public relations. In July 2001, Addis Ababa Water and Sewerage Authority (AAWSA) organised a water week with one segment dedicated to water education;
- Enhanced network of educational officials from the participating cities – useful in the exchange of ideas and experiences among the countries;
- Better collaboration between education and water sector officials and creation of the required synergy in the implementation; and
- Significant impact on Water for Asian Cities Programme launched during the WSSD in Johannesburg.

3.5
Activities in Phase 2

The second phase of UN-HABITAT's Values-Based Water and Sanitation Education programme started with the training of trainers workshops for West and Central Africa in Dakar, and East and Southern African countries in Ndola. Phase 2 involves consolidating the education programme in Phase 1 cities by promoting investments in water and sanitation facilities in schools and extending the programme to more cities.

By complementing the technical and regulatory measures put in place to address avoidable wastage, Values-Based Water and Sanitation Education plays a strategic role in bringing about positive attitude changes, and in the longer term, helps develop a new water-use ethic in society. A HVWSHE capacity-building program includes:

- HVWSHE teacher training programmes in colleges of education;
- HVWSHE in-service refresher training programmes in schools;
- HVWSHE orientation programmes for new schools;
- Sanitation and hygiene education in schools and communities;
- Reinforce learning activities in water classrooms, through the provision of resource materials adapted to city-specific conditions and needs;
- Reinforce non-formal HVWSHE programmes in communities and informal schools, with a focus on pro-poor governance (for example, using the participatory approach);
- Expansion from seven to twelve countries;
- Up-scaling good work in the education sector not just focusing on curriculum but also teacher training colleges;
- More innovations for water classrooms; and
- Increased investments for water and sanitation to schools.

**HVWSHE resource materials preparation program**
This entails the review of existing national education curricula in schools and development of a new pedagogic guide, lesson plans, and supplementary materials (to be vetted by national education officials). Advocacy, awareness raising and information exchange component, to be co-ordinated in the greater programme. Advocacy through school study visits. Awareness raising in the community through HVWSHE TV and radio programmes, newspapers, water and sanitation festivals, etc. Information exchange through education competitions and twinning of schools will complete the activities.

Construction of water and sanitation facilities in schools
In Phase 2 of the programme, selected schools that are participating in the programme will be provided with water and sanitation facilities. Changes in ethics and attitudes cannot take place in the absence of basic facilities. It is expected that hardware provision will be accompanied by the education programme, which is seen as the software that facilitates the new ethic in water and sanitation.

Module 2

Water, Sanitation and Hygiene Challenges in Africa's Urban Areas
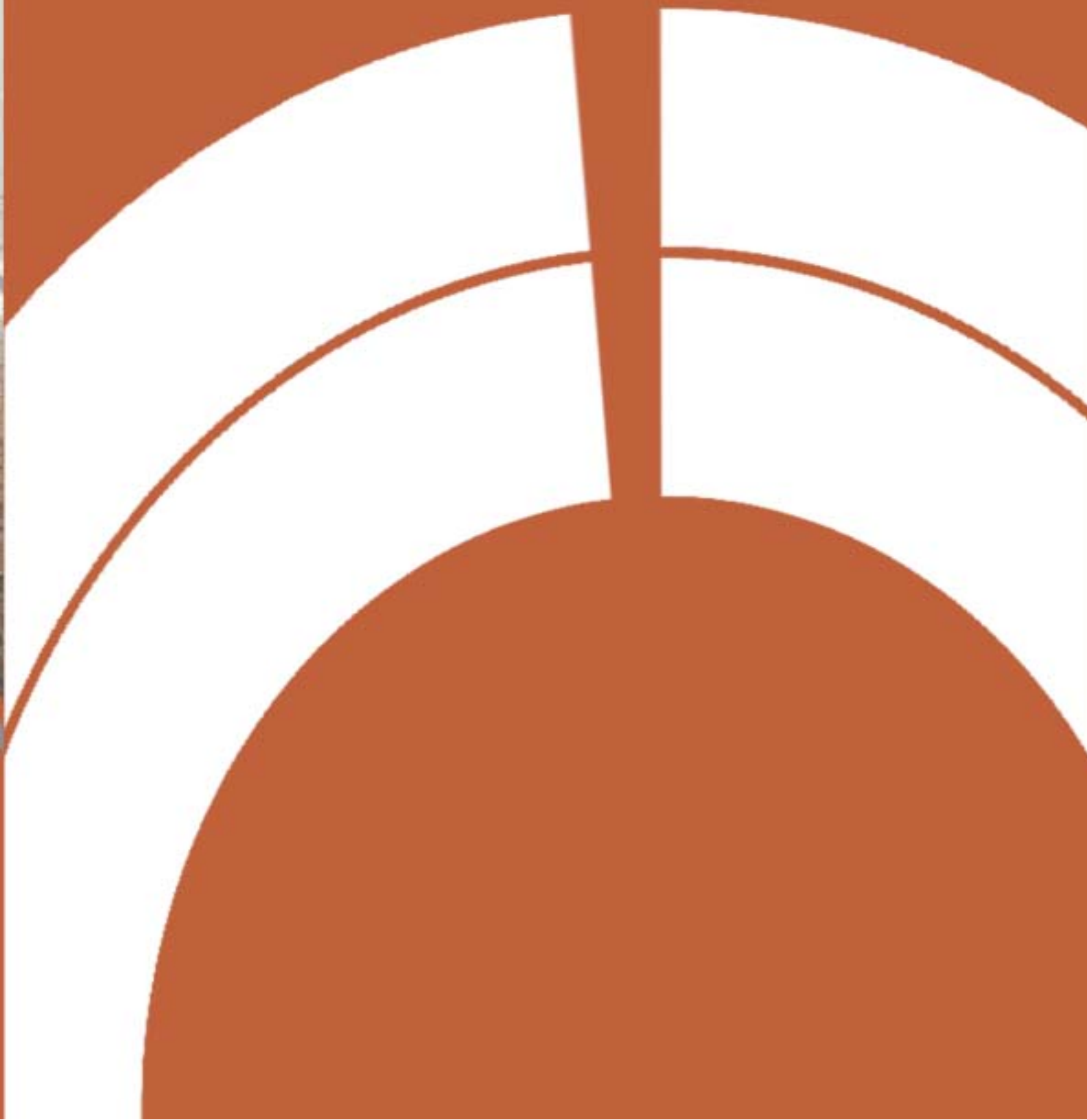
Aims of the Module

The aim of this module is to highlight the water, sanitation and hygiene challenges in Africa's urban areas and the role that Human Values can contribute in addressing them. It explores the impact of the unprecedented pace of urbanisation on the provision of safe drinking water and adequate sanitation in Africa's urban areas.

Intended Learning Outcomes

On completion of this module, learners should be able to acquire knowledge and skills necessary for understanding:

- The water, sanitation and hygiene challenges in Africa's urban areas;
- The current innovative ways of responding to the urban Water, Sanitation and Hygiene Challenges and making the urban environment sustainable; and
- The role that Human Values can contribute in addressing the urban Water, Sanitation and Hygiene Challenges.

Key Issues

The following areas will be discussed and shared with the learners:

- The centrality of water and sanitation in meeting the Millennium Development Goals in Africa's urban areas;
- The water, sanitation and hygiene challenges associated with rapid urbanisation;
  - Rising levels of urban poverty;
  - The crisis of urban water governance;
  - The health burden; and
  - Ecological footprints of cities.
- Meeting the Urban Water, Sanitation and Hygiene Challenge;
  - Supplying water by managing demand; and
  - Improving Urban Governance.
- Human Values: The missing link in the chain of good governance.

Unit I: The centrality of water and sanitation in meeting the Millennium Development Goals in Africa's urban areas.

Safe drinking water, adequate sanitation and hygiene are the most important preconditions for sustaining human life, for maintaining ecological systems that support all life and for achieving sustainable development. Water is intrinsically interconnected with the eight Millennium Development Goals (MDGs) agreed upon by the international community in 2000. The sanitation component was added to the original MDG target on water during the WSSD in Johannesburg in 2002. While poverty is the underlying theme of all MDGs, water and sanitation, particularly for the poorest, provides an entry point for action to achieve each of these goals.

Millennium Development Goal – the centrality of water and sanitation

Meeting the internationally agreed targets on water and sanitation is particularly important because of the impact it could produce on the quality of life of the poor and the downstream effect on many other MDG targets.

"In a world where some 1.1 billion people lack access to safe water and 2.4 billion people lack access to basic sanitation, what could be a more direct attack on poverty (Goal 1) than to enable them to access these vital, life-sustaining services that could protect their health and improve their productivity?

In a world where 2 million children die, needlessly, every year, for the lack of water or for its poor quality, what could be a better starting point to reduce child mortality (Goal 4)?

In a world where millions of girl children are forced to trade education for collecting water, or dropout from schools for the lack of even minimal sanitation facilities, what could be a better way to promote universal primary education (Goal 2) or gender equality and empowering of women (Goal 3)?

And in a world where one billion people live in slums in overcrowded condition without access to basic services, what would be a concrete way to make significant improvements in their lives (Goal 7, target 11) other than access to water and sanitation?"

Source: Excerpts from the Keynote Address of Dr. Anna Tibaijuka, Executive Director, UN-HABITAT, at the Stavanger International Conference on "Water for the Poorest"

In Africa, more than elsewhere, water, sanitation and hygiene are at the core of all development challenges:

- Every year, due to the lack of access to safe drinking water and sanitation, cholera, typhoid and different forms of dysentery take the lives of millions of children;
- Owing to the lack of water points and adequate water distribution networks, tens of millions of little girls are forced to fetch water every day instead of going to school;

- The poor in Africa are forced to spend too much of their limited income, energy and time to get insufficient amounts of water;
- Rapid population increase, in towns especially, results in greater water abstraction from watercourses and groundwaters leading to sometimes irreversible damage to the environment and to a multiplication of disputes over water use; and
- What is worse is that, contrary to popular belief, the poor often pay up to 20 times as much as the rich for this precious resource.

What are the Challenges?

Water is abundant in Africa on a regional scale but is unevenly distributed by nature. Although a few African countries have high annual averages of rainfall, many already or soon will face water-stress or scarcity conditions where the population cannot be sustained with available water resources. Given current population projections, over 400 million people are expected to be living in at least 17 water-scarce African countries by the year 2010.[1] Their lack of water will severely constrain food production, ecosystem protection and socio-economic development.

The unprecedented pace of urbanisation compounds this situation. Generally, Africa is hailed as the last great un-urbanised continent on earth. Even today, two-thirds of the total population of sub-Saharan Africa is rural – 200 years after the beginning of the industrial revolution. Yet, the continent has the world's fastest annual rate of urbanisation. The annual average urban growth rate is 4 per cent, twice as high as Latin America and Asia. Already, 37 percent of Africans live in cities, and by the year 2030 this is expected to rise to 53 per cent.

As centres of economic and social activity, cities provide a unique critical mass of highly productive skills and opportunities that drive development forward – but at a cost. Meeting competing demands from commercial, domestic and industrial users puts great pressures on freshwater resources. Many African cities are already faced with enormous backlogs in housing and infrastructure development, and struggling with increasingly overcrowded transportation systems, insufficient water supplies, deteriorating sanitation and environmental pollution.

According to UN-HABITAT's recent Global Report on Water and Sanitation in the World's Cities[2], Sub-Saharan Africa's urban population has the world's worst provision for urban water and sanitation. As many as 150 million urban residents in Africa, up to 50% of the urban population, do not have adequate water supplies, while 180 million, roughly 60% lack adequate sanitation. In spite of this, people continue to migrate to cities in the hope of jobs, education, health care, and better living standards. The result is a lowering of the quality of life, reduced urban productivity, and increased burden of health care and unmitigated environmental pollution.

In particular, urbanisation can dramatically increase per capita use of freshwater. Fast population growth with accelerated urbanisation, combined with scarce water supplies and poor sanitation, means that governments often cannot supply enough water to meet demand.[3] Globally, the number of urban residents without access to improved water sources rose from 113 million in 1990 (5% of the total urban population) to 173 million in 2000 (6% of the total urban population), according to a study by WHO and UNICEF (See **Table I**).

Water is often scarce in urban areas of developing countries. For example, in Sierra Leone, in 2000, the piped water supply covered just 23% of the country's 1.8 million urban dwellers.[4] Moreover, at least one-third of urban water supplies in Africa and Latin America and one-half in Asia operate only intermittently. Most residents of Mombasa, Kenya, for example, have water pipes in their homes, but water flows into them for an average of only three hours per day. When piped water supplies are inconsistent, people turn to other sources of water that are usually more expensive and/or unsafe.

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[1] *Declaration of African Ministers responsible for Water Resources at the International Conference on Freshwater in Bonn, Germany, 3 to 7 Dec. 2001.*
[2] *United Nations Human Settlements Programme (UN-HABITAT). **Water and Sanitation in the World's Cities: Local Action for Global Goals**, 2003. Earthscan Publications Ltd. UK.*
[3] *WHO/UNICEF Joint Monitoring Programme for Water Supply and Sanitation. **Global Water Supply and Sanitation Assessment 2000 Report**. Geneva, World Health Organisation (WHO) and United Nations Children's Fund (UNICEF), Apr. 24, 2001. 79 p.*
[4] *WHO/UNICEF Joint Monitoring Programme For Water Supply and Sanitation. **Global Water Supply and Sanitation Assessment 2000 Report**. Geneva, World Health Organisation (WHO) and United Nations Children's Fund (UNICEF), Apr. 24, 2001. 79 p.*

Urban water supplies often are contaminated from a variety of sources, including discharge of untreated industrial wastes, leaching from waste dumps into surface and ground water, inadequate treatment of sewage, and poor solid waste management.[5] Few cities in Africa have adequate sewerage systems, and they often are limited to more advantaged areas. Purification and recycling of wastewater in sewage treatment plants is rare. Worldwide, two-thirds of the sewage from urban areas is pumped untreated into lakes, rivers, and coastal waters.[6]

Table I: Global Urbanisation Trends

- Urban areas are gaining an estimated 67 million people per year — about 1.3 million every week

- By 2030 about 5 billion people are expected to live in urban areas — 60% of the projected global population of 8.3 billion

- The urban population of developing countries is projected to grow at an average annual rate of 2.4%, twice the overall annual population growth rate of 1.2% in the developed world.

- In the next 30 years the urban population of developing countries is projected to double, from just under 2 billion in 2000 to nearly 4 billion by 2030.

- In 2000 there were 388 cities in the world with 1 million or more residents. By 2015 there will be a projected 554 such cities. Of these, 426 — over three-quarters — will be in developing countries.

- Currently, the UN lists 17 megacities (with at least 10 million), all but four in developing countries. By 2015, the UN projects, 21 cities will have at least 10 million residents

Source: United Nations Population Division. World Urbanisation Prospects: The 2001 Revision. New York, UN, Mar. 20, 2002. 182 P.

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[5] *Brennan, E.M.* **Population, urbanisation, environment and security: A summary of the issues.** *Washington D.C., Woodrow Wilson International Center for Scholars, 1999. p 4-14.*
[6] *World Health Organisation.* **Health and environment in sustainable development: Five years after the earth summit.** *Geneva, World Health Organisation, 1997. (No. WHO/EHG/97.8) 245 p.*

Table II. Access to Improved[1] Water and Sanitation in Urban Areas by Region, 1990 and 2000

Region	Population Without Access (in Millions)		Population with Access (in Millions)		% Population with Access[2]	
	1990	2000	1990	2000	1990	2000
WORLD						
Water	113	173	2179	2672	95	94
Sanitation	415	403	1877	2442	82	86
AFRICA						
Water	31	44	166	253	84	85
Sanitation	30	46	167	251	85	84
ASIA						
Water	57	98	972	1254	94	93
Sanitation	339	297	690	1055	67	78
LATIN AMERICA & CARIBBEAN						
Water	26	29	287	362	92	93
Sanitation	46	51	267	340	85	87
OCEANIA						
Water	0	0	18	21	100	98
Sanitation	0	0	18	21	99	99
EUROPE						
Water	0	3	522	542	100	100
Sanitation	0	8	522	537	100	99
NORTH AMERICA						
Water	0	0	213	239	100	100
Sanitation	0	0	213	239	100	100

[1] The WHO/UNICEF Joint Monitoring Programme for Water Supply and Sanitation defines "improved" sources as those that are better than previous sources, although not necessarily safe for household use.
[2] Due to rounding, figures may not total 100% even if the population without access is shown as 0.Source: WHO/UNICEF Joint Monitoring Programme for Water Supply and Sanitation, 2001 (150)Population Reports.

Water, Sanitation and Hygiene Challenges associated with Rapid Urbanisation

1.
Urbanisation and Feminisation of Poverty

Meeting the water and sanitation needs of fast-growing African cities is further complicated by rising poverty levels. Globally, it is estimated that about 30% of the poor now live in urban areas.[7] By 2035, the proportion is projected to reach 50%.[8] But nowhere is the challenge of urban poverty more daunting than in Africa. Sub-Saharan Africa has some of the world's highest levels of urban poverty, reaching over 50% of the urban populations in Chad, Niger, and Sierra Leone[9]. According to UN-HABITAT's Global Report on Human Settlements, Sub-Saharan Africa has the world's largest proportion of urban residents living in slums[10] – areas characterised by their lack of basic services, substandard housing, overcrowding, hazardous locations, insecurity of tenure and social exclusion. These slums are home to 72 per cent of urban Africa's citizens. That percentage represents a total of 187 million people. In Nairobi, an estimated 1.5 million people, roughly 60% of the City's official total population of 2.5 million, live in slums and informal settlements.[11]

Official statistics often disguise the real problem of the poor in cities and towns. For example, in Kenya, the official statistics show that 96 per cent of the urban residents have access to 'improved' sanitation. A reality check can give a very different picture. A recent UN-HABITAT assessment of water and sanitation situation in the world's cities indicates that in many slums, 150 or more inhabitants daily queue up for one public toilet.[12] A slum dweller in Nairobi or Dar es Salaam, is forced to rely on private water vendors, pays five to seven times more for a litre of water than an average North American citizen. The health and economic impacts of these service deficiencies can be very costly to a country in the long run.

Basic services needed for good health often do not reach the urban poor because municipal authorities do not recognise many informal settlements for political and administrative reasons, and thus these areas are not eligible for services. In some cases, slum areas are not classified as urban precisely because they lack services.[13]

Also, the urban poor often settle on land not suitable for housing. Extending infrastructure such as roads, water mains, and sewer lines can be difficult because of rough terrain. Moreover, such neighborhoods often are developed haphazardly, without planning to allow space for infrastructure. In order to lay water or sewer pipes, the utility authorities often must remove or relocate many houses. In addition, governments and donor agencies give low priority to providing such services as primary health care, basic education, family planning, water and sanitation, and nutrition, according to an analysis of 17 developing countries around the world.[14] In urban areas, the poor usually suffer most from the lack of basic services but are the last to be included in urban planning and

[7] The World Bank sets the income poverty line at US$1 a day per person for international comparisons. Developing countries often set their own income poverty lines, usually defined as the income needed to buy a specified amount of food plus a few essential nonfood items

[8] Ravallion, M. **On the urbanisation of poverty.** Washington, D.C., World Bank, Jul. 2001. 12 p.

[9] World Bank. **World development indicators 2002.** Washington, D.C., World Bank, 2002. These income-based statistics should be interpreted cautiously; the true extent of urban poverty is greater than they suggest. Poverty levels estimated on the basis of income alone do not account adequately for the larger numbers of people with such impoverishment as inadequate housing and lack of clean water and sanitation.

[10] Urban slums include both high-density dwellings, such as high-rise apartments, and squatter settlements and shanty-towns, where people occupy vacant land and illegally build shacks for themselves. Many illegal settlements are built on land poorly suited for housing — for instance, on floodplains or on steep hillsides — and are especially prone to damage from natural disasters (United Nations Centre for Human Settlements (HABITAT). **An urbanizing world: Global report on human settlements,** 1996. Oxford, Oxford University Press, 1996. 559 p.

[11] UN-HABITAT/GOK Nairobi Situation Analysis Report 2001.

[12] United Nations Human Settlements Programme (UN-HABITAT). **Water and Sanitation in the World's Cities: Local Action for Global Goals,** 2003. Earthscan Publications Ltd. UK.

[13] Solo, T.M., Perez, E., And Joyce, S. **Constraints in providing water and sanitation services to the urban poor.** Washington, D.C., Water and Sanitation for Health (WASH) Project, Mar. 1993. (WASH Technical Report No. 85) 32 p.

[14] Harrington, J., Porter, C., and Reddy, S. **Financing basic social services. In: Choices for the Poor: Lessons from National Poverty Strategies.** New York, United Nations Development Programme (UNDP), Mar. 2001. p. 173-202.

infrastructure improvements. Their disadvantage mainly reflects their lack of political power and influence.[15]

People in slums often must pay more for services than other urban residents, and they receive services of lower quality.[16] The scarcity of public water supplies forces many low-income urban residents to use other water sources, often private water vendors who charge many times the public rate.[17] Poor households often spend 5% to 10% of their incomes to buy water.[18] In such conditions, women and children suffer the most. They are forced to wait until dark to defecate, exposing themselves to harassment and sexual assaults. Many girls also drop out of school due to lack of proper sanitation facilities, further worsening the already desperate conditions of their families.

Table III: Key Water, Sanitation and Hygiene Concerns in Africa

- Water scarcity – Given current population projections, over 400 million people are expected to be living in at least 17 water-scarce African countries by the year 2010. Their lack of water will severely constrain food production, ecosystem protection and socio-economic development.

- Poor access to safe water and adequate sanitation – With recurring droughts and chronic water shortages in many areas, the majority of African Governments and people pay an increasingly high price for water or the lack of it. The highest price is often paid by the poor majority in terms of money to buy small quantities of water, calories expended to fetch water from distant sources, impaired health, diminishing livelihoods and even lost lives thus exacerbating the cycle of poverty. Today, over 300 million people in Africa still do not have reasonable access to safe water. Even more lack adequate sanitation.

- Water-related diseases – Almost half the people of the African continent suffer from water-related diseases. The result is economically crippling, and from a humanitarian standpoint, simply degrading.

- Degradation of the ecosystem – Aquatic species, habitats and ecosystems are also at risk. With increasing water demand throughout Africa to support greater agricultural productivity, industrial expansion, rural and urban growth, more water to meet human needs means less for maintaining aquatic ecosystems and the many other species and environmental services they support.

- Poor management of international waters – With over 50 major international water basins in Africa, two or more countries share most watercourses. Most international basins are without any agreements on equitable use or environmental protection. Few have effective institutional arrangements for consultation or cooperation. Procedures for avoiding all resolving international disputes over water are largely lacking.

Source: Declaration of African Ministers responsible for Water Resources at the International Conference on Freshwater in Bonn, Germany, 3 to 7 Dec. 2001.

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[15] United Nations Centre for Human Settlements (HABITAT). **The state of the world's cities 2001.** Nairobi, UNCHS, 2001. 125 p.

[16] United Nations Centre for Human Settlements (HABITAT). **The state of the world's cities 2001.** Nairobi, UNCHS, 2001. 125 p.

[17] United Nations Centre for Human Settlements (HABITAT). **Cities in a globalizing world: Global report on human settlements 2001.** London, Earthscan, 2001. 344 p., WHO/UNICEF Joint Monitoring Programme for Water Supply and Sanitation. **Global water supply and sanitation assessment 2000 report.** Geneva, World Health Organisation (WHO) and United Nations Children's Fund (UNICEF), Apr. 24, 2001. 79 p.

[18] Hardoy, J., Mitlin, D., and Satterthwaite, D. **Environmental problems in an urbanizing world — Finding solutions for cities in Africa, Asia and Latin America.** London, Earthscan Publications, 2001. 448 p., UNITED NATIONS CENTRE FOR HUMAN SETTLEMENTS (HABITAT). Cities in a globalizing world: Global report on human settlements 2001. London, Earthscan, 2001. 344 p.

2.
The Crisis of Urban Water Governance

The primary responsibility for ensuring the sustainable and equitable management of water resources rests with the African Governments. This includes strengthening policy, legislative and institutional reforms, including decentralisation and empowerment of local communities for integrated water resources management. However, governance is more than government. It includes not only the organisation of and the relationships between political and administrative institutions but also the relationships among government, private institutions, and civil society.

African cities rarely develop with careful urban water and wastewater management and the governance structures these require. For example, while the urban poor struggle for water, more than half of the water produced at a high cost to serve the needs of the burgeoning African cities is lost even before it reaches the consumers (See **Table IV** below). It is estimated that up to 70% of the water pumped into cities in the developing world is lost before it can reach the intended consumers.[19] Leakage is often a sizeable source of water loss. It results from either lack of maintenance or failure to update old systems. There is also little control of wasteful and profligate water use.

Good urban water management is complex, and requires not only water and wastewater infrastructure but also pollution control (especially from industries), sustainable use of water sources, wastewater management and flood prevention. In addition, it requires coordination across many sectors and, usually, between different local authorities as most cities' water supplies and wastewater are not limited to water catchments within their boundaries.

Table IV: What is unaccounted-for water?

In every water distribution system, a discrepancy exists between the quantities of water delivered into the distribution network and the total measured quantity, or estimated quantity, of water actually delivered at consumers' premises and at other user points.

This so called "unaccounted-for" water use is the quantity of water, which cannot be charged to any user. The term "unaccounted-for water" (UFW) represents the difference between net-production and consumption, whether metered or not. The definition is simple, but determining the true figure can cause some difficulties.

How is unaccounted-for water calculated?

Production – sales = unaccounted for water

The percentage of unaccounted-for water (PCT) can be computed by dividing total unaccounted-for water by total water production for the period under review times 100.

PCT = [Unaccounted-for water] ÷ [Water Produced] x 100

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[19] United Nations Centre for Human Settlements (HABITAT). *Cities in a globalizing world: Global report on human settlements 2001. London, Earthscan, 2001. 344 p., Warner, D. Drinking water supply and environmental sanitation for health. Presented at the International Conference of Water and Sustainable Development. Paris, 1998. 10 p., Wegelin-Schuringa, M. Water demand management and the urban poor. Delft, The Netherlands, International Water and Sanitation Centre, 2002. 14 p.*

3.
The Health Burden

Providing an adequate water supply and improving public sanitation are the two steps most needed to prevent the majority of water-related diseases and deaths in urban areas.[20] Pollution causes many deaths and much illness among urban residents. Particularly in developing countries, urban water supplies are often fouled with wastes, and clean water is scarce. Worldwide, about 2.3 billion people suffer from diseases that are linked to water problems.[21] Water-related diseases kill millions of people each year, prevent millions more from leading healthy lives, and undermine development efforts.[22] Estimates show that 6,000 people a day, equivalent to the entire population of an African town like Luderitz, Namibia, 2 million a year, the equivalent of a quarter of the population of London, England, are dying as a result of sub-standard sanitation.[23] Nearly half of urban residents in Africa, Asia, and Latin America suffer from one or more of the main diseases associated with the inadequate provision of water and sanitation.[24]

Diarrhoeal diseases are the major water-borne malady, responsible for 90% of the health problems related to water supply and sanitation.[25] An estimated 4 billion cases of diarrhoeal disease occur every year, causing 3 million to 4 million deaths, mostly among children.[26] Other diseases such as cholera can become endemic when there is poor food hygiene, lack of sanitation, or unsafe drinking water.[27]

4.
Ecological footprints of Cities

Rapid urbanisation can create enormous stresses on the natural environment. These stresses extend far beyond the land that urban areas actually occupy to affect the land that provides the resources to sustain urban life. Urban areas claim the ecological output and life-support functions of both nearby areas and distant regions.[28] For example, urban areas take up just 2% of the earth's surface but account for about 75% of industrial wood use. Similarly, 60% of the water withdrawn for human use goes to urban areas — about half of that to irrigate food crops for urban residents, roughly one-third for use by industry, and the remainder for drinking and sanitation.[29] The environmental impact of urban areas is often invisible to urban residents themselves because the ecosystems that support them may be far away.

As urban areas expand, so does their environmental impact. As the population of cities in developing countries have increased dramatically, so have levels of per capita resource consumption, water and air pollution, and soil degradation and contamination.[30] The extent of urban environmental impact increases not only as population grows but also as per capita demand for resources rises, both from industries and consumers.

A range of economic, political, and social factors that determine how cities develop and respond to growth also has powerful effects on the environment. In

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[20] Vanderslice, J. and Briscoe, J. *Environment interventions in developing countries: Interactions and their implications.* American Journal of Epidemiology 141(2): 135-144. Jan. 15, 1995.

[21] Kristof, N. *For Third World water is still a deadly drink.* New York Times. (New York), Jan. 9, 1997. p. 2., United Nations (UN) Commission On Sustainable Development. *Comprehensive assessment of the freshwater resources of the world.* New York, UN, 1997. 39 p., . World Health Organisation. *Health and environment in sustainable development: Five years after the earth summit.* Geneva, World Health Organisation, 1997. (No. WHO/EHG/97.8) 245 p.).

[22] Nash, L. Water quality and health. In: Gleick, P., ed. Water in Crisis: A Guide to the World's Fresh Water Resources. New York, Oxford University Press, 1993. p. 25-39., Olshansky, S., Carnes, B., Rogers, R., and Smith, L. *Infectious diseases — New and ancient threats to world health.* Population Bulletin 52(2): 2-43. Washington D.C., Population Reference Bureau. Jul. 1997.

[23] Tore J. Brevick, UNEP Spokesman/Director of the Division of Communications and Public Information, 2001.

[24] World Health Organisation (WHO). *Health: Creating healthy cities in the 21st Century.* In: Satterthwaite, D., ed. The Earthscan Reader in Sustainable Cities. London, Earthscan Publications, 1999. p. 137-172.

[25] Hunt, C. *How safe is safe?* London School of Hygiene and Tropical Medicine and Water, Engineering and Development Centre, Loughborough University, 2001. 22 p.

[26] Olshansky, S., Carnes, B., Rogers, R., and Smith, L. *Infectious diseases — New and ancient threats to world health.* Population Bulletin 52(2): 2-43. Washington D.C., Population Reference Bureau. Jul. 1997

[27] World Health Organisation. *Health and environment in sustainable development: Five years after the earth summit.* Geneva, World Health Organisation, 1997. (No. WHO/EHG/97.8) 245 p.).

[28] Mcmichael, A.J. *Environmental change and human health: Extending the sustainability agenda.* In: Munn, T., ed. Encyclopedia of Global Environmental Change. Vol. 3. West Sussex, UK, John Wiley & Sons, 2002. p.130-145.

[29] O'meara, M. *Reinventing cities for people and the planet.* Worldwatch Paper. Washington, D.C., Worldwatch Institute, 1999. (147) 68 p.

[30] United Nations Centre for Human Settlements (HABITAT). *An Urbanizing World: Global Report On Human Settlements, 1996.* Oxford, Oxford University Press, 1996. 559 P.

Common reasons for unaccounted-for water

Unaccounted-for water fall under two categories:

1. Technical losses include:
- Water lost by leakage from the distribution network.
- Water supplied to the consumer but not recorded by the meter. This may include small leaks in consumer's plumbing system, or dripping taps, even if the meter is in satisfactory condition.
- Water supplied to the consumer but not recorded because the meter is defective (Damaged meters).
- Losses through air release valves typically arising from poor maintenance.

2. Administrative losses include:
- Water supplied to the consumer but not completely paid because quantity is estimated too low (in case of payment based on estimated consumption – lump sum).
- Incorrect meter reading.
- Tampering with meters.
- Water supplied through illegal connections.
- Billing procedure errors.

What can be done to reduce unaccounted-for water?
- Keep good figures on production and use, and review them regularly.
- Keep all meters in good working condition. Replace customer meters on a regular basis.
- Meter all uses as practical, and read the meters regularly.
- Fix leaks promptly.

Determine the cause of chronic leaks, such as those from old corroded lines or glue joints, and whether line replacement is necessary.

particular, when urban development is unplanned and unregulated and urban areas expand haphazardly, urban living conditions usually worsen. As a result, the surrounding environment suffers – for example, through the unsanitary disposal of wastes and air and water pollution.

The burden of urban environmental problems invariably falls disproportionately on the poor. When municipal authorities do not collect solid waste, for example, poor people often have no choice but to dispose of their garbage in uncontrolled dumping areas to let it rot where it stands. Also, when governments do not help the poor gain access to suitable land for housing, many families settle in fragile areas such as wetlands or steep hillsides. Such families face great risk from natural and human-induced environmental hazards.[31]

[31] *World Resources Institute (WRI).* **World resources: A guide to the global environment 1996-97.** *New York, Oxford University Press, 1996. 365 p.*

What is an ecological footprint?

As urban areas grow and develop, they rely on natural resources from farther and farther away to meet their production and consumption demands. In the process, their "ecological footprint" weighs heavier and heavier on the natural environment. The ecological footprint represents the land area necessary to sustain consumption and waste disposal of a specific population.

The concept provides a measure of the impact that a population has on nature. In order to sustain the earth's ecosystem indefinitely, the ecological footprint of humankind should be only about 1.7 hectares of land per capita. At current levels of consumption, however, our ecological footprint averages about 2.3 hectares of land per capita. This level clearly cannot be sustained over the long term because it is about one-third larger than earth's natural capacity.

The calculation of ecological footprints for cities should not obscure the fact that certain enterprises and higher income groups contribute disproportionately to these footprints. The ecological footprint of a low-income household is much less than that of a wealthier one. In industrialised countries over the past 25 years, per capita consumption levels have increased consistently at about 2.3% per year. In some developing countries, however, the increase has been even greater, while starting from a much lower base. In East Asia, for example, consumption has increased by an average of 6.1% per year, reflecting an increasing standard of living.

As population has grown rapidly in urban areas of developing countries, and per capita consumption levels have risen as well, resource use has soared. Worldwide, fossil fuel burning has increased five fold since 1950. Fresh water consumption has doubled since 1960. Consumption of wood is 40% greater than it was 25 years ago, and seafood consumption has quadrupled.

With greater resource consumption comes greater waste production. For instance, the average amount of waste generated each day in Rio de Janeiro in 1997 was 8,042 tons compared with 6,200 tons in 1994. Growing per capita consumption accounted for this rise. During the three-year period the population of the city itself grew hardly at all.

*Sources: CHAMBERS, N., SIMMONS, C., and WACKERNAGEL, M. **Sharing nature's interest: Ecological footprints as an indicator of sustainability.** London, Earthscan Publications, 2001. 185 p.; WACKERNAGEL, M., ONISTO, L., LINARES, A.C., FALFÁN, I., GARCÍA, J.M., GUERRERO, A., and GUERRERO, G.S. **Ecological footprints of nations: How much nature do they use? How much nature do they have?** Veracruz, Mexico, Centro de Estudios para la Sustentabilidad. Universidad Anáhuac de Xalapa, Mar. 10, 1997. 30 p.*

Meeting the Urban Water, Sanitation and Hygiene Challenge

New innovative ways of responding to the urban Water, Sanitation and Hygiene Challenge and making the urban environment sustainable are being explored. These include:

1.
Supplying water by managing demand

From both economic and environmental standpoints, saving water is more effective than trying to find or develop new sources. Managing the demand for water contributes to more efficient and equitable provision of clean water supplies.[32] UN-HABITAT's *Water for African Cities Programme* is founded on the fact that managing the demand for water contributes to more efficient and equitable provision of safe water supplies.

Pricing water to reflect its value as a scarce resource is crucial to saving water. Pricing water minimally or not at all encourages wasteful use. Cities often provide water at inordinately low prices to those who are connected to the water supply system—usually middle- and upper-class residential neighborhoods and central business areas. Water use fees may not even cover costs, let alone generate any revenue to pay for extending service to poorer neighbourhoods.[33]

Since access to water supply depends on income and location, conserving water by managing its price is complex. For example, for high-income and middle-income groups, the most effective water pricing measures include increasing rates and raising awareness about the importance of water conservation. Measures to increase access to water often make water more expensive for the poor, who may not be able to afford water tariffs. Tariff structures designed to conserve water must penalise overuse but not restrict access for the urban poor. With tariffs in place, high-volume consumers, to some extent, can help to subsidise water for the poor.

Often, potable water is used where lower-quality water would be acceptable. For example, potable water is sometimes used to flush toilets, wash vehicles, and clean streets. Instead, treated wastewater or urban runoff can be reused efficiently for some of these purposes and for irrigating crops.

2.
Improving Urban Governance

Around the world, a new consensus is emerging that national governments should not retain direct control over the planning and management of urban areas. Instead, national governments should act as enablers, creating legislative and administrative environments in which a wide range of local governments, private-sector firms, and community organisations can deliver infrastructure and services to urban areas. For example, national governments can focus on attracting favourable foreign investments, encouraging appropriate technology transfers, undertaking joint public-private initiatives to provide housing and basic services, and setting environmental standards.

Decentralising power, authority, and responsibility from national to local governments can enhance local participation and encourage democratic practices. Decentralisation can improve the effectiveness of public policy implementation and produce policies and programmes that are both more efficient and more responsive to local preferences and needs.

Better local governance is key to meeting urban water, sanitation and hygiene challenges. Shifting authority from central governments to municipalities can help make policies, plans, and actions more responsive, especially to the urban poor. Donors and international agencies can focus more on strengthening institutional capabilities needed to meet the challenges of rapid urban growth. Urban planning can do more to address such interrelated issues as land use, slum upgrading, improved water supply, sanitation, waste management, and more efficient transportation.

[32] Wegelin-Schuringa, M. **Water demand management and the urban poor.** Delft, The Netherlands, International Water and Sanitation Centre, 2002. 14 p.

[33] RAY, K. and KAKBEEKE, W.J. **Community participation in urban water and sanitation: The missing link in public-private partnership.** Presented at the International Conference on Water and Sustainable Development, Paris, Mar. 19-21. 1998. 12 p.

# Human Values: The Missing Link in the Chain of Good Governance

The current water and sanitation crisis is increasingly viewed as a crisis of governance rather than a crisis of scarcity. Increasing donor dependence, the lack of aid-effectiveness due to rampant corruption, the absence of trust between communities and public authorities, the lack of motivation to pay for public services, are all pointers to this crisis which ultimately affect service delivery and its sustainability.

Good governance seeks to improve the efficiency, equity and sustainability in service provision by making the best use of available public, private and community resources. Current approaches to water and sanitation management focus on developing policies, legislation and institutional frameworks with a view to promote good governance. Experience, however, shows that these have not brought about

any fundamental change in behaviour and personal attitudes, and in the underlying values of the people that influence decisions.

A growing body of evidence derived from water and sanitation projects implemented by spiritual organisations[34] suggests that a value-based approach can bring about positive attitudinal changes and a new ethic of water management in society. The value-based approach stimulates the Human Values inherent in every man – compassion, tolerance, honesty, solidarity and shared responsibility, among others – to motivate inspirational action, and can lay a sound foundation for good governance. A conceptual framework for integrating Human Values in water and sanitation management is given in Figure 1.
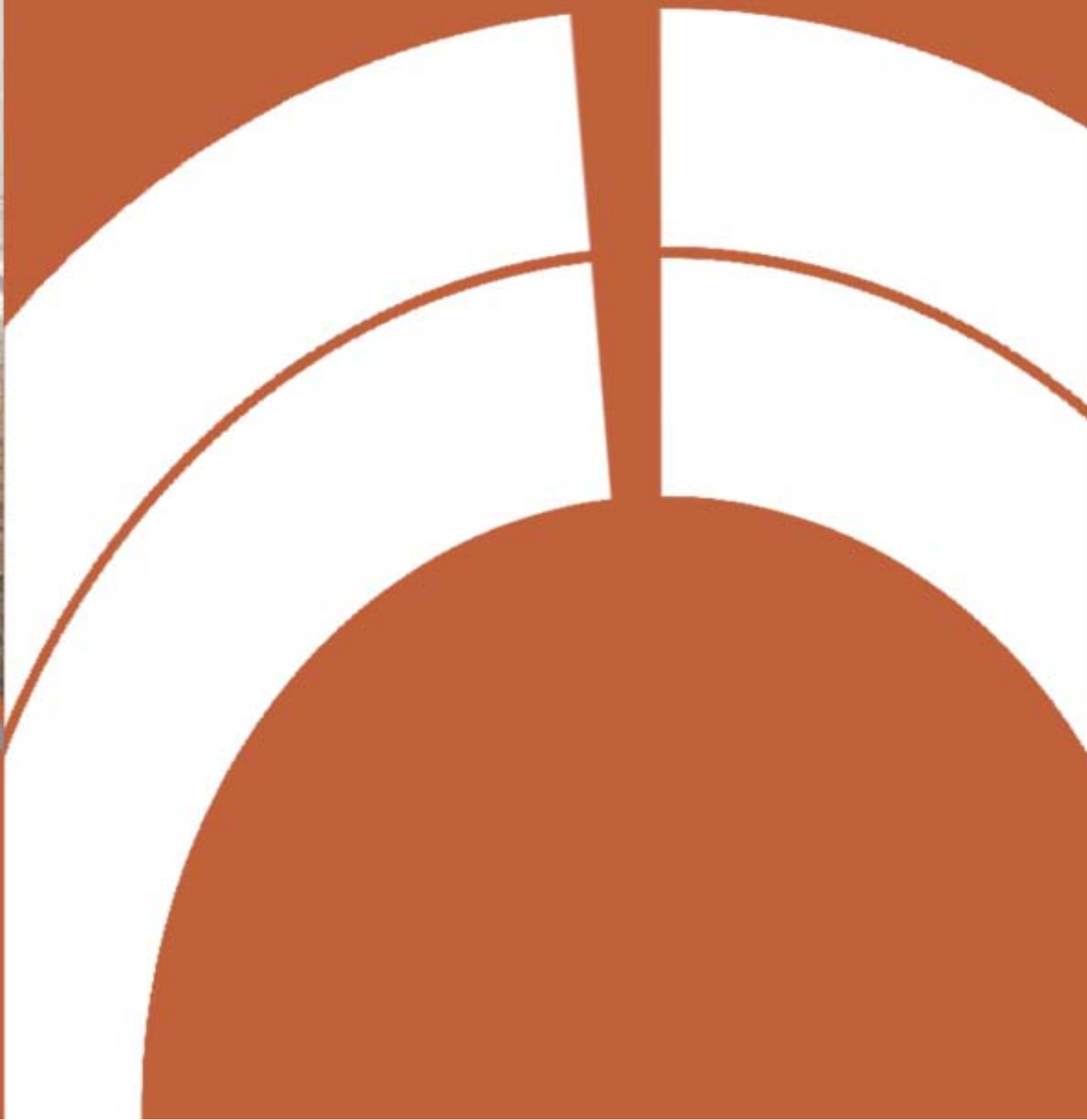
Fig. 1: Conceptual Framework for Integrating Human Values to Water Management

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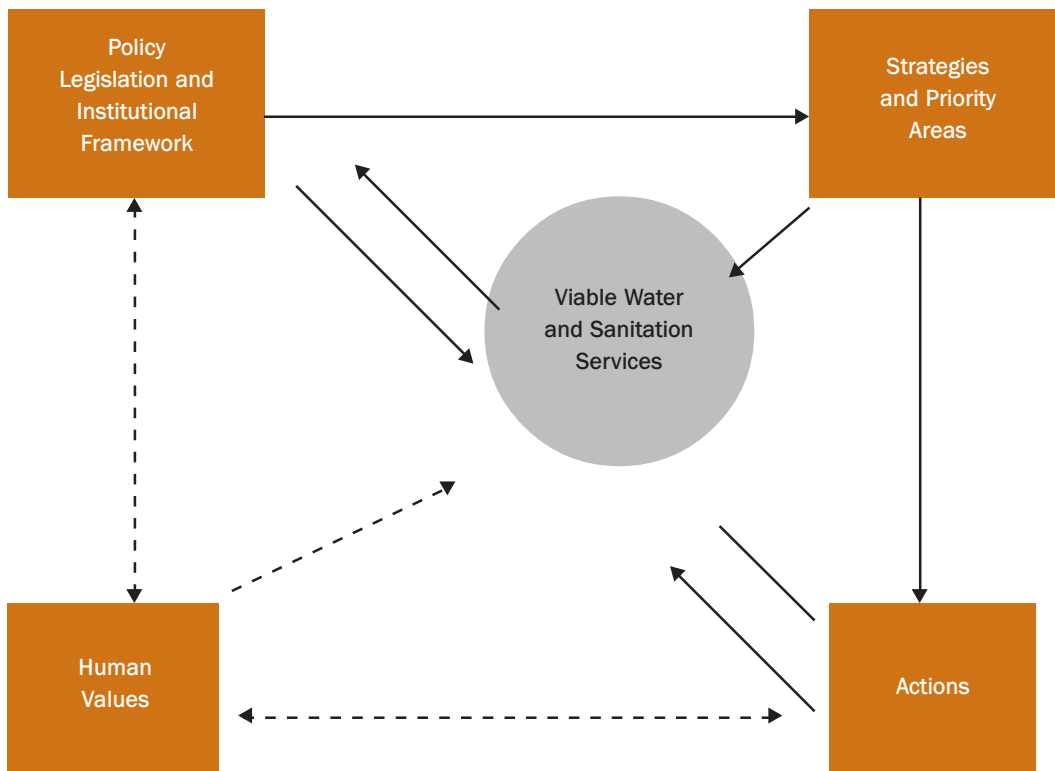
[34] E.g., the Sanitation project in West Bengal, India, by Sri Ramakrishna Mission and the Drinking Water Supply project in Andhra Pradesh, India, by Sri Sathya Sai Central Trust.

Module 3

Practical Knowledge on Water and Sanitation

Aims of the Module

The aim of this module is to provide learners with practical knowledge and skills on water and sanitation.

Intended Learning Outcomes

On completion of this module, learners should be able to acquire:

• Basic knowledge on water and sanitation; and
• Practical skills on water and sanitation.

Key Issues

The following areas will be discussed and shared with the learners:

• Where is Earth's water located and in what forms does it exist?
• How much of Earth's water is available for our uses ... and in what forms does it exist?
• What are the physical and chemical properties of water that make it so unique and necessary for living things?
• Practical water saving tips;
• Grey water reuse at home;
• Rainwater harvesting;
• Main sources of water contamination;
• Health and sanitation issues pertaining to water;
• Safe disposal of human waste;
• Water-related diseases;
• Household water treatment and safe storage; and
• The water treatment cycle.

Where is Earth's water located and in what forms does it exist?

Although more than three quarters of the earth's surface is made up of water, only 3 percent of the Earth's water is available for human consumption. The other 97 percent is in the oceans; however, this water is too salty to use for most purposes, and the salt is very costly to remove. Most of the Earth's freshwater is frozen in polar ice caps, icebergs, and glaciers.
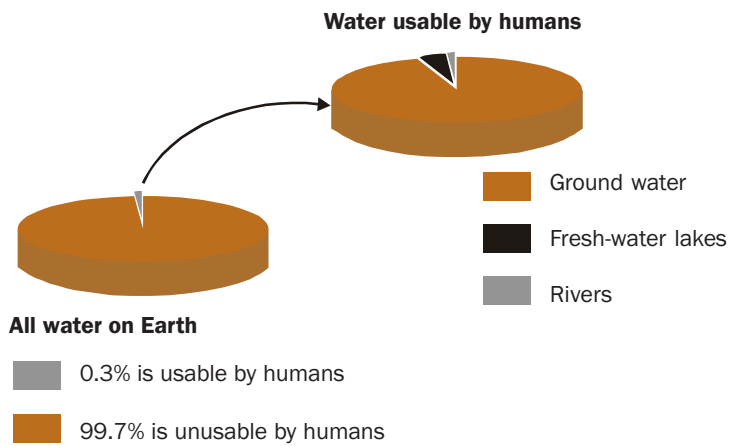
Distribution of Earth's Water
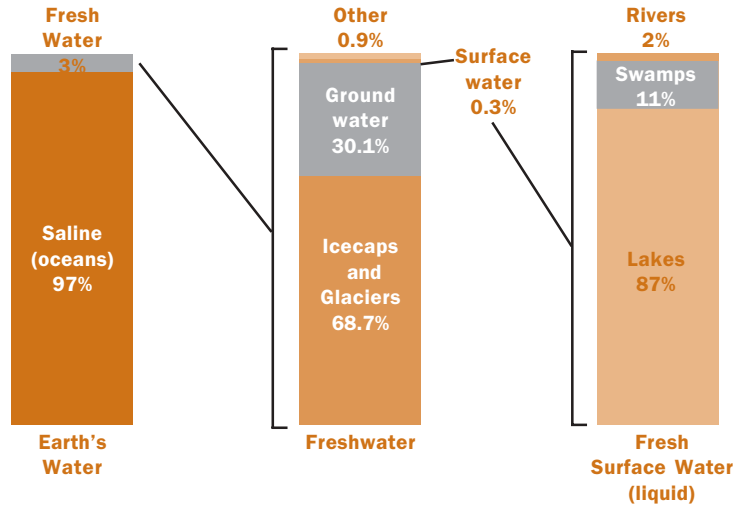
*Source: United States Geological Survey, **Water Science for Schools***
URL: http://ga.water.usgs.gov/edu/earthwherewater.html

How much of Earth's water is available for our uses ... and in what forms does it exist?

How much of Earth's water is usable by humans?

Water usable by humans

- Ground water
- Fresh-water lakes
- Rivers

All water on Earth

0.3% is usable by humans

99.7% is unusable by humans

*Source: United States Geological Survey, **Water Science for Schools***
URL: http://ga.water.usgs.gov/edu/earthwherewater.html

Over 99 percent of all water (oceans, seas, ice, and atmosphere) is not available for our uses. And even of the remaining 0.3 percent (the small brown slice in the top pie chart), much of that is out of reach. Considering that most of the water we use in everyday life comes from rivers (the small light blue slice in the right-side pie chart), you'll see we generally only make use of a tiny portion of the available water supplies. The right-side pie shows that the vast majority of the fresh water available for our uses is stored in the ground (the large brown slice in the second pie chart).

What are the physical and chemical properties of water that make it so unique and necessary for living things?

Water's Chemical Properties

You probably know water's chemical description is H_2O. One atom of oxygen is bound to two atoms of hydrogen. The hydrogen atoms are "attached" to one side of the oxygen atom, resulting in a water molecule having a positive charge on the side where the hydrogen atoms are and a negative charge on the other side, where the oxygen atom is. Since opposite electrical charges attract, water molecules tend to attract each other, making water kind of "sticky." The side with the hydrogen atoms (positive charge) attracts the oxygen side (negative charge) of a different water molecule.

All these water molecules attracting each other mean they tend to clump together. This is why water drops are, in fact, drops! If it wasn't for some of Earth's forces, such as gravity, a drop of water would be ball shaped — a perfect sphere.

- Water is called the "universal solvent" because it dissolves more substances than any other liquid. This means that wherever water goes, either through the ground or through our bodies, it takes along valuable chemicals, minerals, and nutrients;
- Pure water has a neutral pH[35] of 7, which is neither acidic[36] nor basic;[37]

Water's Physical Properties

- Water is unique in that it is the only natural substance that is found in all three states — liquid, solid (ice), and gas (steam) — at the temperatures normally found on Earth. Earth's water is constantly interacting, changing, and in movement;
- Water freezes at 32° Fahrenheit (F) and boils at 212°F (at sea level, but 186.4° at 14,000 feet). In fact, water's freezing and boiling points are the baseline with which temperature is measured: 0° on the Celsius scale is water's freezing point, and 100° is water's boiling point. Water is unusual in that the solid form, ice, is less dense than the liquid form, which is why ice floats;
- Water has a high specific heat index. This means that water can absorb a lot of heat before it begins to get hot. This is why water is valuable to industries and in your car's radiator as a coolant. The high specific heat index of water also helps regulate the rate at which air changes temperature, which is why the temperature change between seasons is gradual rather than sudden, especially near the oceans;
- Water has a very high surface tension. In other words, water is sticky and elastic, and tends to clump together in drops rather than spread out in a thin film. Surface tension is responsible for capillary action[38], which allows water (and its dissolved substances) to move through the roots of plants and through the tiny blood vessels in our bodies; and
- Here's a quick rundown of some of water's properties:
  - Weight: 62.416 pounds per cubic foot at 32°F;
  - Weight: 61.998 pounds per cubic foot at 100°F;
  - Weight: 8.33 pounds/gallon, 0.036 pounds/ cubic inch; and
  - Density: 1 gram per cubic centimeter (cc) at 39.2°F, 0.95865 gram per cc at 212°F.

  By the way:
  1 gallon = 4 quarts = 8 pints = 128 ounces = 231 cubic inches
  1 litre = 0.2642 gallons = 1.0568 quart = 61.02 cubic inches
  1 million gallons = 3.069 acre-feet = 133,685.64 cubic feet

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[35] pH ranges from 0 to 14, with 7 being neutral. pHs less than 7 are acidic while pHs greater than 7 are alkaline (basic).

[36] A substance that has a pH of less than 7, which is neutral.

[37] A base is a substance that has a pH of more than 7, which is neutral.

[38] Capillary Action is defined as the movement of water within the spaces of a porous material due to the forces of adhesion, cohesion, and surface tension. Capillary action occurs because water is sticky — water molecules stick to each other and to other substances, such as glass, cloth, organic tissues, and soil. Dip a paper towel into a glass of water and the water will "climb" onto the paper towel. In fact, it will keep going up the towel until the pull of gravity is too much for it to overcome.

Practical Water Saving Tips

Is your home water-wise?

There are a number of ways to save water, and they all start with you. Answer these questions as you tour your home and learn ways you can save water around the house by changing your personal habits.
Visit http://www.wateruseitwisely.com/100ways/sw.html for 100 ways to save water in your home.

Personal Habits	often	sometimes	never
Keep showers to under 5 minutes			
Use only a little water in the bathtub			
Turn off the water while brushing your teeth			
Put water in the sink when washing up			
Flush the toilet when necessary. Don't use it to flush away wastepaper or bugs			
Use a broom to clean the driveway or sidewalk			
Use a bucket when washing the car			
Use a turn-off nozzle on the end of the hose to adjust the water flow and turn the water off and on			
Turn water faucet off tight			
Put water in the kitchen sink to wash and rinse dishes			
Run the dishwasher only when it's full			
Run the clothes washer only when it's full			
Total the number of checks in each row			

Source: http://www.wateruseitwisely.com/familywater/index.html

Water Conservation Tips

(http://www.tempe.gov/water/water1.htm)

Bathroom

- Check faucets and pipes for leaks. Check your indoor water using appliances and devices for leaks. Many silent leaks allow water and your money to go down the drain. Studies have shown homes can waste more than 10% due to leaking, which costs both you and the environment;
- Turn off the water while brushing your teeth or shaving, rather than running a steady stream;
- Limit showers to five minutes;
- Replace standard showerheads with low-volume heads or flow restrictors;
- Check your toilet periodically for leaks. Place a few drops of food colouring in the tank. After a few minutes, if you see colour in the bowl, you have a leak, perhaps caused by a faulty flapper. Listen for gurgling sounds coming from your toilet. These noises indicate the flush valve needs to be adjusted to stop wasting water;
- Fill a plastic, one quart bottle with water and place it in the toilet tank. To anchor the bottle, partially fill it with sand or any heavy substance. This does not affect the efficiency of most toilets and can save five or more gallons per day per a family of four. Do not use bricks to displace water in your toilet tank they will break down, over time, and can cause problems; and
- Avoid using your toilet for a wastebasket or ashtray. Extra flushes wastewater and money.

Kitchen & Laundry

- Automatic dishwashers and washers are more efficient if run only when they are full;
- When washing dishes by hand, don't let the tap run freely to rinse. Fill the second side of the sink with rinse water; and
- Fill a pitcher with drinking water and store it in the refrigerator.

Outside

- When washing the car, use soap and water from a bucket. Use a hose with a shut-off nozzle for the final rinse;
- Use a broom when cleaning your driveway;
- Adjust sprinklers so only the lawn is watered and not the house, sidewalk, or street. Do not water on windy days. Check and maintain your sprinkler system regularly;
- Water your lawn every third day. Always water

Do it Yourself: Toilet Leak Detection

Leaking toilets cause more water waste than any other fixture in the home. Even a silent toilet leak (that's one you normally can't hear) will waste from 30 to 500 gallons of water per day! The ones you can hear will waste much, much more. Such wastage can normally be attributed to a faulty water level adjustment or to a leaky flapper.

Leaky flappers and the "dye test"
Most people will say their toilet does not leak. There is one sure way to find out. Put some food dye in the tank and then leave for 15 minutes. When you return, look into your bowl to see if there is now dye colour in the water spot. If there is colour, or if you already can hear and or see water running in your bowl, it's time for a new flapper!

Source: Water Saving Home, URL: http://www.h2ouse.org/index.cfm

during the cool time of the day to minimise evaporation. Early morning is best, and the peak water consumption hours (4 p.m. – 9 p.m.) should be avoided;

- Adjust your irrigation schedule to accommodate changes in seasonal water demand. Install an automatic timer;
- For landscaping, use native or other low water use plants; and
- Using a layer of mulch around plants reduces evaporation and promotes plant growth. Water retaining basins also allow water to be concentrated around the plants.

Greywater Reuse at home

Greywater is wastewater from bathtub, shower drain, sinks, washing machines, and dishwashers. Greywater accounts for 60% of the outflow produced in homes. It contains little or no pathogens and 90% less nitrogen than black water (toilet water). Because of this, it does not require the same treatment process. By designing plumbing systems to separate it from black water, grey water can be recycled for irrigation, toilets, and exterior washing, resulting in water conservation.

The most obvious advantage of domestic greywater use is that it replaces potable water use. If greywater is used on vegetation, potable water is saved or conserved. Not only does its use on landscape conserve potable water, but greywater actually may be better for plants, its use resulting in more vigorous vegetation. Greywater may contain detergents with nitrogen or phosphorus, which are plant nutrients. It may also contain, however, sodium and chloride, which can be harmful to some sensitive species.

Do it Yourself: Faucet Repair

Leaky faucets, while not as serious a problem as leaky toilets, can waste a significant amount of water. Faucets typically leak because of old gaskets or O-rings and corroded valve seats. The single most common mistake in faucet repair is not taking along the faucet/parts when buying the replacement parts.

Before working on any faucet turn the water off and open the lines to drain the water out. Cover the sink with a towel to protect it from tools that might drop and to prevent small parts from falling into the drain. Wrap the jaws of wrenches with tape to protect the finish of the faucet.

If you have less water flow when you turn the water back on after a plumbing repair, rust is probably clogging a valve. Old steel pipes (especially hot water lines) rust on the inside. When you turn the water back on, rust scales break loose and lodge in the valves. To clear them out, open them to full flow. Also unscrew the faucet aerators and rinse them clean.

Source: Water Saving Home, URL: http://www.h2ouse.org/index.cfm

Figure 1: Schematic of a Typical Rainwater Catchment System
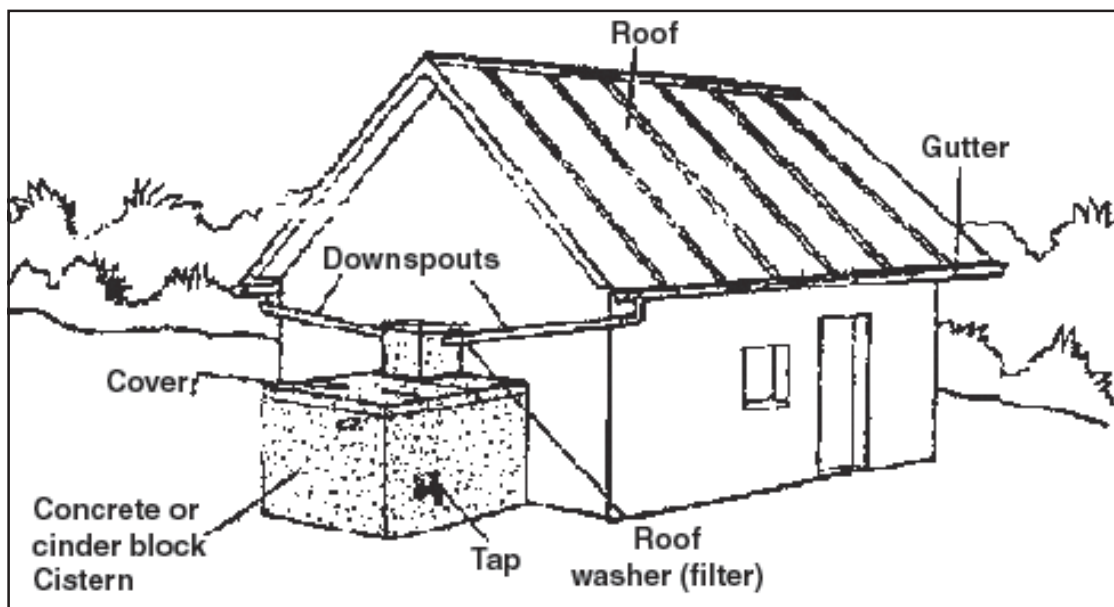
Harvesting the Rain

Rainwater harvesting is collecting rainfall to meet water needs. A rainwater harvesting system concentrates and collects for direct use and storage rain falling on house and grounds. Free, literally falling from the sky, harvested rainwater splendidly augments domestic water resources.

Rainwater harvesting has been practiced for more than 4, 000 years, and, in most developing countries, is becoming essential owing to the temporal and spatial variability of rainfall. Rainwater harvesting is necessary in areas having significant rainfall but lacking any kind of conventional, centralised government supply system, and also in areas where good quality fresh surface water or groundwater is lacking. Figure 1 (page 43) shows a schematic of a rooftop catchment system.

All catchment surfaces must be made of nontoxic material. Painted surfaces should be avoided if possible, or, if the use of paint is unavoidable, only nontoxic paint should be used (e.g., no lead-, chromium-, or zinc-based paints). Overhanging vegetation should also be avoided.

Rainwater harvesting systems require few skills and little supervision to operate. Major concerns are the prevention of contamination of the tank during construction and while it is being replenished during a rainfall. Contamination of the water supply as a result of contact with certain materials can be avoided by the use of proper materials during construction of the system. The main sources of external contamination are pollution from the air, bird and animal droppings, and insects. Bacterial contamination may be minimised by keeping roof surfaces and drains clean but cannot be completely eliminated. If the water is to be used for drinking purposes, filtration and chlorination or disinfection by other means (e.g., boiling) is necessary.

A rainwater harvesting system consists of three basic elements: a collection area, a conveyance system, and storage facilities. The collection area in most cases is the roof of a house or a building. The effective roof area and the material used in constructing the roof influence the efficiency of collection and the water quality. A conveyance system usually consists of gutters or pipes that deliver rainwater falling on the rooftop to cisterns or other storage vessels. Both drainpipes and roof surfaces should be constructed of chemically inert materials such as wood, plastic, aluminium, or fibreglass, in order to avoid adverse effects on water quality.

The water ultimately is stored in a storage tank or cistern, which should also be constructed of an inert material. Reinforced concrete, fibreglass, or stainless steel are suitable materials. Storage tanks may be constructed as part of the building, or may be built as a separate unit located some distance away from the building.

Maintenance guidelines for the operation of rainwater harvesting systems

- A procedure for eliminating the "foul flush" after a long dry spell deserves particular attention. The first part of each rainfall should be diverted from the storage tank since this is most likely to contain undesirable materials, which have accumulated on the roof and other surfaces between rainfalls. Generally, water captured during the first 10 minutes of rainfall during an event of average intensity is unfit for drinking purposes.
- The storage tank should be checked and cleaned periodically. All tanks need cleaning; their designs should allow for this. Cleaning procedures consist of thorough scrubbing of the inner walls and floors. Use of a chlorine solution is recommended for cleaning, followed by thorough rinsing.
- Care should be taken to keep rainfall collection surfaces covered, to reduce the likelihood of frogs, lizards, mosquitoes, and other pests using the cistern as a breeding ground. Residents may prefer to take care to prevent such problems rather than have to take corrective actions, such as treating or removing water, at a later time.
- Chlorination of the cisterns or storage tanks is necessary if the water is to be used for drinking and domestic uses.
- Gutters and down pipes need to be periodically inspected and cleaned carefully. Periodic maintenance must also be carried out on any pumps used to lift water to selected areas in the house or building. More often than not, maintenance is done only when equipment breaks down.
- Community systems require the creation of a community organisation to maintain them effectively. Similarly, households must establish a maintenance routine that will be carried out by family members.
- As has been noted, in some cases the rainwater is treated with chlorine tablets. However, in most places it is used without treatment. In such cases, residents are advised to boil the water before drinking. Where cistern users do not treat their water, the quality of the water may be assured through the installation of commercially available in-line charcoal filters or other water treatment devices. Community catchments require additional protections, including:
    - Fencing of the paved catchment to prevent the entry of animals, primarily livestock such as goats, cows, donkeys, and pigs that can affect water quality.
    - Cleaning the paved catchment of leaves and other vegetative matter.
    - Repairing large cracks in the paved catchment as a result of soil movement, earthquakes, or exposure to the elements.
    - Maintaining water quality at a level where health risks are minimised. In many systems, this involves chlorination of the supplies at frequent intervals.

Source: Rainwater harvesting from rooftop catchments,
URL: http://www.oas.org/osde/publications/

Water Contamination

Water containing poisonous or dangerous substances is "contaminated" or "polluted" and can be harmful to our health. This contamination is not always visible so water that looks clean and clear may not be safe to drink.

The main sources of contamination are:

Human Waste

Faecal Waste: When lavatories (latrines) and water-closets are not used by people, faecal waste is often left all over the ground. This washes into water sources when it rains and causes water contamination or pollution. Poverty also leaves people vulnerable to poor water and waste management. The storage of water is generally in very unhygienic containers

Household rubbish: Household rubbish can also contain poisonous substances.

Industrial /Agricultural Waste

Pesticides: When large quantities of pesticides are used on the shamba they may wash into the water sources during the rain. Pesticides are usually poisonous.

Chemical: Many industries produce chemical "waste" which they discharge into the rivers or lakes. The water then becomes contaminated. These are also from "Jua kali" garages, chemical oils, etc.

Discourage use of polluted water from streams, potholes, burst pipes, water thoroughly boiling etc.

Animals and Animal Waste

Some animals carry diseases, which can be transmitted to human (e.g. worms) so when they or their waste comes into contact with a water source it can become contaminated.

Human Contact

If people wash or play in a water source they may transfer diseases through germs. These germs in the water can infect other people. Also if people use dirty containers to collect in the water, it can become contaminated.

Solid Waste

Waste management is the process of applying hygiene principles in the collection, storage transportation and disposal of waste, with a view of protecting health and the environment. Waste can be defined as unwanted materials or substances, which results from the activities of man. In our every day life we carry out various activities, which results in the production of waste of various kinds. The waste produced can be hazardous to people and the environment.

Such hazards are:

- The spread of diseases associated with poor sanitation such as typhoid and cholera;
- The breeding of flies, mosquitoes and other vermin;
- Emission of offensive smell; and
- Pollution of rivers, lakes and land.

It is therefore, necessary to find better ways in which we can manage our waste not to contaminate water system.

Sources of Solid Waste

Solid waste comes from various sources namely:
- Domestic;
- Trade;
- Agricultural activities;
- Industrial activities; and
- Special waste (such as from hospitals).

Domestic waste

This is solid waste from residential areas. This may include paper, vegetable matter, rags, house sweepings, hedge cuttings and plastics. The amount of waste produced in houses varies in composition and quantity.

Trade waste

This is waste from commercial premises e.g. shops and restaurants. Shop waste includes wrapping and packaging materials such as paper, plastics, rags, cartons and etc. Restaurant waste on the other hand includes vegetable matter such as food remains, peelings and wrapping materials.

Agricultural waste

This waste consists of by-products from agricultural activities such as coffee berry husks, stalks and husks of cereals, legumes and other plants. It also consists of containers of agricultural chemicals such as insecticides, herbicides and fertilisers.

Industrial waste

This is from industries e.g. food manufacturing, timber, chemical and metal industries. The type of waste produced varies with industry and the nature of the raw materials used. For example, food industry produces vegetable matter like pineapple, and sugarcane peelings and sometimes packing and packaging materials. Timber industry produces mainly timber chipping and saw dust. Chemical industries produce waste that is highly concentrated in chemicals or they produce chemicals as waste. This may be present in the form of gas, liquid or solid.

Special waste

This waste requires special handling because of its nature e.g. some hospital waste and highly toxic radioactive waste from some industries.

Health and Sanitation Issues Pertaining to Water

Though water is necessary for human survival, contaminated water can contribute to the spreads of disease like cholera, dysentery and typhoid. Water sources need to be protected from contamination so that we can remain healthy. Other diseases like malaria are spread by mosquitoes which breed in stagnant pools of water. Proper sanitation involves good hygiene and good management of the environment so that disease-causing organisms or their carriers cannot survive. Some of the things we can do are washing of hands after using the latrine or before handling food, as well as proper disposal of human waste.

Good Sanitation

Safe disposal of human waste

It is important that the area around the home and school is clean and safe from waste. In slum areas, children defecate and urinate in the open because many households do not have latrines. This is particularly serious as people live close to each other, thus increasing the chances of the spread of many diseases. Flies will be attracted to the excreta and they will spread germs when they come in contact with our food. Excreta can be carried by rain into water sources like rivers and streams and contaminate our water supplies. It is therefore important to dispose of excreta safely by using a latrine.

Wash hands after visiting the latrine

Dirty hands can carry germs, which cause diseases. When hands are washed after visiting the latrine, many diseases can be prevented. Always make it a habit of washing your hands with clean water and soap after using the latrine.

Never touch food/water with unwashed hands

Hands should be washed before handling food so that germs will not contaminate our food. Food that is not going to be cooked, especially raw fruits and vegetables should be carefully washed before eating.

Use of Latrines and Toilets

Pit latrines should be at least 10m from well or water source.

Pit latrines should be above the ground water level.

The latrine should be used correctly: It should be kept clean at all times. Hands should always be washed after visiting latrines or toilets or toilet or after one has disposed off faeces.

Food Hygiene

Disease-causing organisms enter the human body when a person ingests contaminated food or water. Micro-organisms in the contaminated food multiply

at room temperatures and release poisons which cause illness. Diseases contracted by eating contaminated food are called food-borne diseases. Signs include diarrhea, vomitting, stomach pains and body weakness.

Some sources of food contamination are:

- Food containers;
- Dirty hands;
- Flies;
- Toilet; and
- Contaminated water.

How to avoid food-borne diseases:

- Wash hands before eating;
- Keep all foods covered and in a cupboard, away from flies;
- Food containers should preferably be washed thoroughly with soap and hot water;
- Polythene bags should not be reused as food containers; and
- Keep nails short.

Water-related Diseases

There are four main types of disease related to water:

Water-borne
In which the disease (such as dysentery) is carried in the water and a person is infected by drinking the contaminated water.

Water-washed
Diseases are caused by insufficient water to wash with e.g. Scabies.

Water-based
Pathogens (such as worms) live in the water and enter the body directly from the water e.g. Bilharzia.

Insect-based
Insects carrying disease depend on water so the transmission of disease from these insects is also related to water e.g. Malaria.

Household Water Treatment and Safe Storage

Every year, there are 1.6 million diarrhoeal deaths related to unsafe water, sanitation, and hygiene – the vast majority among children under five.[39] More than one billion people lack access to an improved water source. Household water treatment and safe storage interventions can lead to dramatic improvements in drinking water quality and reductions in diarrhoeal disease – making an immediate difference to the lives of those who rely on water from polluted rivers, lakes, and in some cases, unsafe wells or piped water supplies.

Household water treatment and safe storage represents a cost-effective solution not only for those lacking "improved" access, but also for those who have access to water, but whose supplies are unsafe. It is effective, simple, and inexpensive. It is especially applicable to the poor households or to populations recovering from a disaster situation who often lack facilities and resources. For example, if household bleach is available, a dilute chlorine solution can be made up and used to disinfect water. Water can also be safely treated by exposing it to sunlight. All that is required is a discarded clear plastic bottle. Another option to treat water at home is the use of simple ceramic pot filters moulded by local artisans. If available, commercially produced tablets containing chlorine, or sachets with combined flocculation and disinfection properties, can also effectively remove pathogens from water.

Options to purify household water

Boiling (http://www.epa.gov/safewater/faq/emerg.html)

Vigorous boiling for one minute will kill any disease-causing micro-organisms present in water (at altitudes above one mile, boil for three minutes). The flat taste of boiled water can be improved by pouring it back and forth from one container to another (called aeration), by allowing it to stand for a few hours, or by adding a small pinch of salt for each quart of water boiled.

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[39] WHO, http://www.who.int/household_water/en/

Chemical treatment (http://www.epa.gov/safewater/faq/emerg.html)

When boiling is not practical, chemical disinfection should be used. The two chemicals commonly used are chlorine and iodine. Chlorine and iodine are somewhat effective in protecting against exposure to Giardia, but may not be effective in controlling Cryptosporidium. Therefore, use iodine or chlorine only to disinfect well water (as opposed to surface water sources such as rivers, lakes, and springs), because well water is unlikely to contain these disease-causing organisms. Chlorine is generally more effective than iodine in controlling Giardia, and both disinfectants work much better in warmer water.

Chlorine Methods

Chlorine Bleach
When boiling is not practical, chemical disinfection should be used. Common household bleach contains a chlorine compound that will disinfect water. The procedure to be followed is usually written on the label. When the necessary procedure is not given, find the percentage of available chlorine on the label and use the information in the following tabulation as a guide. (If strength is unknown, add ten drops per quart of water. Double amount of chlorine for cloudy or coloured water or water that is extremely cold.)

The treated water should be mixed thoroughly and allowed to stand, preferably covered, for 30 minutes. The water should have a slight chlorine odour; if not, repeat the dosage and allow the water to stand for an additional 15 minutes. If the treated water has too strong a chlorine taste, it can be made more pleasing by allowing the water to stand exposed to the air for a few hours or by pouring it from one clean container to another several times.

Granular Calcium Hypochlorite
Add and dissolve one heaping teaspoon of high-test granular calcium hypochlorite (approximately 1/4 ounce) for each two gallons of water. The mixture will produce a stock chlorine solution of approximately 500 mg/L, since the calcium hypochlorite has an available chlorine equal to 70 percent of its weight. To disinfect water, add the chlorine solution in the ratio of one part of chlorine solution to each 100 parts of water to be treated. This is roughly equal to adding 1 pint (16 oz.) of stock chlorine to each 12.5 gallons of water to be disinfected. To remove any objectionable chlorine odour, aerate the water as described above.

Chlorine Tablets
Chlorine tablets containing the necessary dosage for drinking water disinfection can be purchased in a commercially prepared form. These tablets are available from drug and sporting goods stores and should be used as stated in the instructions. When instructions are not available, use one tablet for each quart of water to be purified.

Tincture of Iodine

Common household iodine from the medicine chest or first-aid kit may be used to disinfect water. Tincture of iodine to each quart of clear water. For cloudy water, add ten drops and let the solution stand for at least 30 minutes.

Iodine Tablets

Commercially prepared iodine tablets containing the necessary dosage for drinking water disinfection can be purchased at drug and sporting goods stores. They should be used as stated. When instructions are not available, use one tablet for each quart of water to be purified.

Water to be used for drinking, cooking, making any prepared drink, or brushing the teeth should be properly disinfected.

Filtration

If filters are available, then water filtration is another option to purify water. Ceramic filters with small pores, often coated with silver for bacteriostasis, have been shown to be effective at removing microbes and other suspended solids. Filters need to be cleaned regularly. For further information, see www.potpaz.org/ or www.purifier.com.np.

Safe Water Storage

Regardless of whether household water is initially of acceptable microbiological quality, it often becomes contaminated with pathogens of faecal origin during transport and storage due to unhygienic storage and handling practices. Studies show that the use of containers with narrow openings for filling, and dispensing devices such as spouts or taps/spigots, protect the collected water during storage and

household use. Improved containers protect household water from the introduction of microbial contaminants via contact with hands, dippers, other fecally contaminated vehicles or intrusion of vectors.

The Water Treatment Cycle

Follow a drop of water from the source through the treatment process.
Water may be treated differently in different communities depending on the quality of the water which enters the plant. Groundwater is water located under ground and typically requires less treatment than water from lakes, rivers, and streams.

1. Coagulation

Coagulation removes dirt and other particles suspended in water. Alum and other chemicals are added to water to form tiny sticky particles called "floc" which attract the dirt particles. The combined weight of the dirt and the alum (floc) become heavy enough to sink to the bottom during sedimentation.

2. Sedimentation

The heavy particles (floc) settle to the bottom and the clear water moves to filtration.

3. Filtration

The water passes through filters, some made of layers of sand, gravel, and charcoal that help remove even smaller particles.

4. Disinfection

A small amount of chlorine is added or some other disinfection method is used to kill any bacteria or microorganisms that may be in the water.

5. Storage

Water is placed in a closed tank or reservoir in order for disinfection to take place. The water then flows through pipes to homes and businesses in the community.

The Bio-Sand Filter

The bio-sand filter offers a household solution that is able to produce greatly improved drinking water from polluted surface water. Slow sand filtration is ranked second only to desalination/evaporation in terms of pathogenic, chemical and physical improvement of water.
(For details, see *www.biosandfilter.org*)

Module 4

Creating New Water, Sanitation and Hygiene Ethic
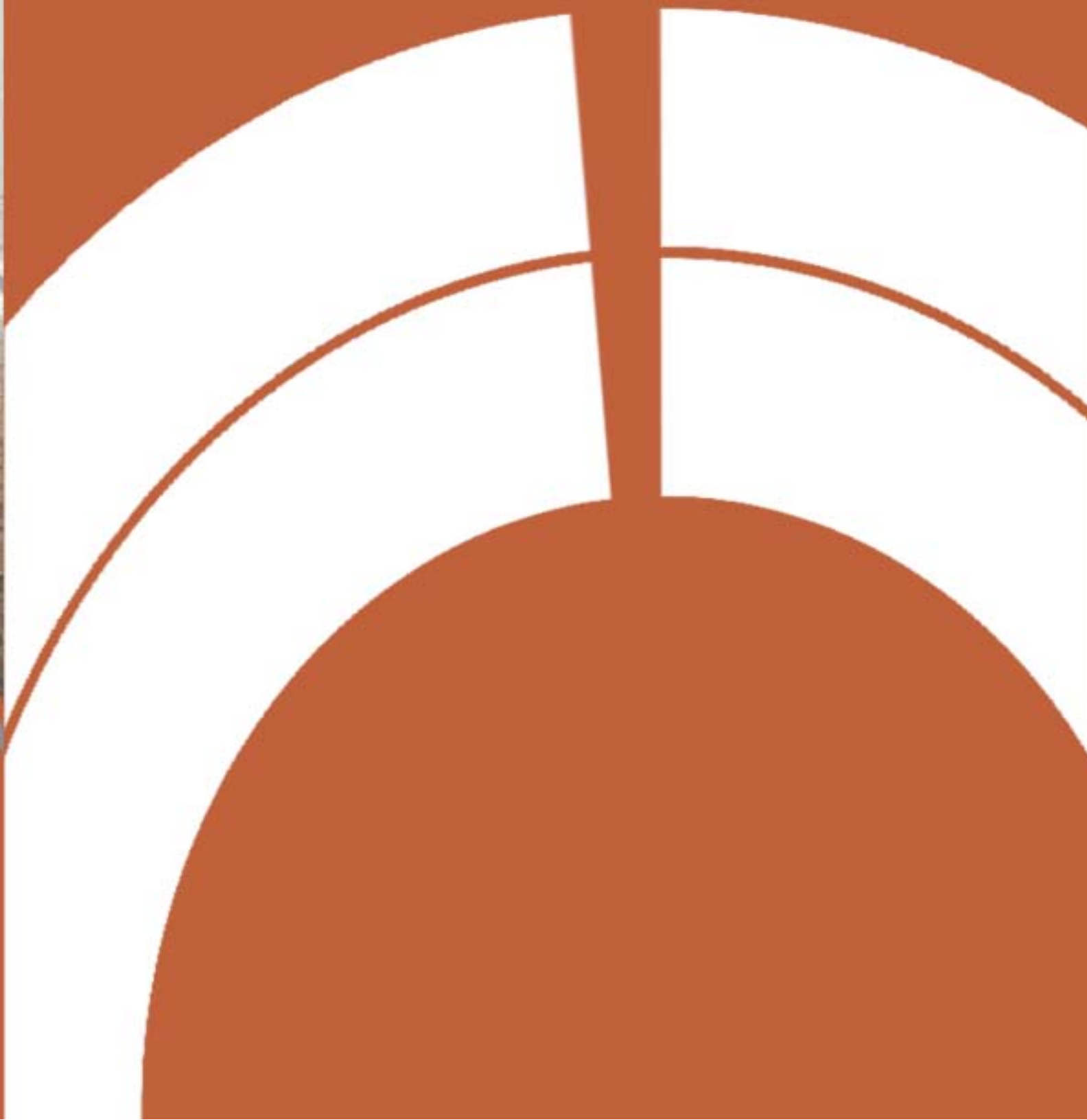
Introduction

It is essential to change old behaviours and habits that are ineffective in order to attain the millennium development goal related to water and sanitation. The Human Values approach is based on the assumption that knowledge and information is not sufficient to bring about changes. A new water, sanitation and hygiene ethic is created by applying human values to knowledge. The module explores a variety of behavioural change theories and models as well as the human values approach to character development and behaviour change. It is by understanding how people change behaviours and applying human values that transformation occurs. This module consists of three units.

Aims of the Module

The aim of this module is to deepen the participant's understanding of behaviour change and for them to acquire the necessary knowledge and skills to facilitate sustainable behaviour changes in water, sanitation and hygiene education.

Learning Outcomes

On completion of this module participants should be able to acquire competencies to:

* Identify facilitating and hindering factors of behaviour change in relation to water, sanitation and hygiene education;
* Access and select information from a variety of sources;
* Understand behaviour change in the context of water, sanitation and hygiene education;
* Apply the human values approach to water, sanitation and hygiene education; and
* Facilitate the process of creating a new water, sanitation and hygiene ethic through the application of human values.

Teaching and Learning Process

Here is an overview of the three units that makes up this module.

Unit 1
The following themes will be presented:
* Introduction to hygiene behaviours.
* Types of hygiene behaviours.
* Which/whose behaviour?
* Behaviour adoption principles: HIC DARM.
* BASNEF realities.
* SARAR Resistance to change.
* Behaviours are sustainable.

Activity 1: Analyse behaviours, attitudes and related values on gender and water and sanitation, based on UN Habitat's video "Unheard Voices of Women."

Unit 2
The following themes will be presented:
* Learning and behaviour change.
* Theoretical perspectives and behaviour change models.
* Participants will be invited to offer comments and ask questions.
* After the participants have exposed to the theoretical frameworks they will engage in an activity.

Activity 2: Reflections on a personal behaviour that you had changed.

Unit 3
Activity 3: Understanding Values.
This activity precedes the presentation. The following areas will then be presented:
* Human Values as the foundation for sustainable behaviour.
* Understanding the sub-conscious, conscious and super-conscious mind.
* The school climate as model for character transformation and behaviour change.
* The participants will be asked to apply their understanding of the school climate to the demonstration sites (schools and teacher training colleges).

Activity 4: Creating a conducive environment to implement HVWSHE.

Documentation

Participants will be given the following resources:

* Teaching and learning materials on creating a New Water, Sanitation and Hygiene Ethic;
* Hard copies of power point slides; and
* Website addresses to access more information.

Unit 1

Introduction

Communication for behavioural change is a complicated process of human actions, reaction and interaction. It involves looking at situations from the viewpoint of other people, and understanding what they are looking for. It means understanding obstacles to change. It means presenting relevant and practical options, and it means telling people what the effect is of the choices they make. Communication can work towards a situation where policymakers, the private sector and the people/ communities become committed to programmes and helps to prevent expensive mistakes.

People tend to change when they understand the nature of change, and view it as beneficial, so that they make an informed and conscious choice to include it in their list of priorities. Unless their circumstances are taken into account, and their needs are met, no effort for change will be successful. People need to be informed and convinced, or they do not feel part of the effort.

Important hygiene behaviours

There are various types of behaviours that are important for improved water, sanitation and hygiene (Hubley 2004):

- Community action – action by communities to change their surroundings;

- Health behaviours – actions people undertake to be healthy, such as washing hands;
- Utilisation behaviours – use of health services such as a latrine;
- Illness behaviours – recognition of symptoms and prompt action, such as diarrhoea or cholera;
- Compliance/adherence – following course of prescribed medicine or action, such as using ORT (Oral Rehydration) solution;
- Another typology of behaviours identified by Hubley:
- Decision-based behaviours, conscious decision making to perform or not to perform the behaviour;
- One-time behaviour;
- Routine behaviour; and
- Addictive behaviours.

Understanding attitudes and behaviour change

What messages are influencing people's knowledge and attitudes and how does that contribute to changes in behaviour? Research from the communication and behavioural change sciences makes it clear that this is a complex issue and evidence shows that the clearer the message on a

BASNEF MODEL		
	Influences	Actions needed
Beliefs, Attitudes (individual).	culture, values, traditions, mass media, education, experiences.	Communication programmes to modify beliefs and values.
Subjective Norms (community).	family, community, social network, culture, social change, power structure, peer pressure.	Communication directed at persons in family and community who have influence.
Enabling Factors (inter sectoral).	Income/poverty, sanitation services, women's status, inequalities, employment, agriculture.	Programmes to improve income, sanitation provision, situation of women, housing, skill training.

concrete topic, the more the audience can relate to it and the higher the chance that knowledge increases. Research in social sciences has shown that knowledge on a topic may increase; people may even change attitudes, but that the step to improved behaviours and practices is depending on a complex set of social and psychological factors. Hubley introduced the BASNEF model for understanding behaviours in health communication: Beliefs, Attitudes, Subjective Norms and Enabling Factors (Hubley, 1993).

Individual beliefs about the consequences of certain behaviour and the value placed on each consequence leads to personal attitude or judgement. Attitudes combined with subjective norms contribute to behavioural intention. Subjective norms are beliefs about what behaviour other influential people would wish the person to perform. Enabling factors such as income, housing, water supply, agriculture and sanitation should be available so that the intention leads to a change in behaviour.

Below the influences on behaviour and communication actions needed in the BASNEF-model are explained.

The starting point is the individual person's behaviour. However, an understanding of the influences on behaviour can lead to interventions that go beyond the individual to include programmes at the family, community and national levels and involve both educational, social, economic and political change.

Strategies, approaches and steps

A systematic approach to plan and implement a strategy for advocacy and awareness raising will be needed to mobilise different segments of society to support the development of sustainable sewage management. This consists of the following seven components in a process:

1. Identification and determination of the issues that need to be addressed in the strategy

Advocacy requires agreements on specific issues to be addressed. These may change in the course of the strategy and can be adapted as the need arises. An unclear 'goal' for advocacy will prevent clear messages to be formulated and this will hinder reaching the intended audiences in an effective way. While at the beginning of the strategy formulation, it

will not be possible to set verifiable goals, the issue can be determined. Thus, in the case of sewage management, this may be the call for a clean river or a clean lake, as was very effectively done with the river Ganga in India, to mobilise support for the major Ganga Action Plan.

2. Assessment of the current situation with regard to sewage management

Before it is possible to develop a strategy for public awareness raising for sewage management, it is necessary to get an overview of the present situation with regard to sewage. This assessment can focus on the different systems that are in use for human waste collection and disposal, waste water disposal and treatment. This can be done on a city wide basis by local government staff, but it can also be done at neighbourhood level, covering only a part of the city. It can be done with the involvement of main stakeholders such as private sector, community level authorities and communities. The assessment in itself can be a powerful tool for public awareness raising as it confronts local authorities and communities/people with the reality and shows them the environmental impact of the absence of the sewerage systems.

3. Assessment of current knowledge, attitude and practices

In addition to the assessment of the 'environmental' status quo, it is necessary to assess what the present knowledge, attitudes and practices are with regard to sewage management. The audience needs to be segmented in order to deliver target oriented messages (see below). But these messages have to be based on what knowledge, attitudes and practices are at present, to be relevant and to see what aims and targets are possible in future. Like with the environmental profile, the involvement in this assessment of the stakeholders at the different levels, may become a public awareness activity in itself.

4. Audience research and segmentation

Segmentation of audiences and their communication needs is essential for effective communication. Without understanding the differences among various segments, or sub-segments, it is difficult to design effective messages that call for change. While themes remain the same, the fine-tuning of the message content, the choice of media mix, and the designing and packaging of the messages will vary. The variation will depend on the circumstances in each case. The communication strategy for sewage management in the long run should encompass all

Attitudes and practices towards sanitation in Zambia

During the sanitation and communication situation analysis that was carried out in Zambia as part of the development of a sanitation strategy, many different attitudes and practices towards latrines were found.

The most common reasons for not using or having latrines are:

- no room for a latrine
- do not want to share a latrine with in-laws
- do not want to share a latrine with the opposite sex
- do not want to share a latrine with non- related people, but cannot deny access to neighbours
- bad smell
- fears of safety for elderly and young children
- faeces is food for the pigs
- fear for snakes in a dark latrine
- do not want to be seen using a latrine

Reasons why people are interested in having a latrine are:

- there is insufficient cover in the neighbourhood
- the public latrine is too far
- the densities are too high for outside defecation
- health reasons, especially cholera
- being modern
- convenience
- able to get one with a subsidy
- ability to take a bath in the (improved) latrine

(Wegelin-Schuringa and Ikumi (1997))

stakeholders and all sections of society. In the short term priority targets should be those who make and influence decisions: policy makers, sector professionals, local government staff and communities/users. It is usually local government that has to take responsibility for action and play a leading role. The process of audience segmentation should be based on research, leading to the design of tailored messages. Speak to potential partners in terms of their own interests and benefits such as economics. Speak to politicians in terms of the interests of their constituents and find common ground.

Target audiences range from national level to community level. Below a short overview is given of such target audiences, the kind of messages that can be delivered to them and the aims such messages can have.

National, regional and provincial level:
At these levels, people make policy decisions and/or influence development. They are an important target group. One reason why sewage management is receiving little attention is because it has not been given any priority at this level. Included in this target group are: politicians (ministers, members of parliament, councillors), professional associations, educational institutions, donors, service organisations (rotary), business people, high profile personalities, NGOs, churches and the media. To mobilise them, it is important to have data and information they need to discharge to their respective audiences.

Messages for this target group include:

- telling what it costs the nation if people get sick with dysentery, cholera or another water and sanitation-related disease due to lack of sewage management;

- clear cost comparisons (for example, spending US$1000 on sanitation, save US$2000 in lost production costs or export costs);
- cholera does not know class division;
- mortality statistics; and
- percentage of sewage coverage, compared to other countries.

Aims may include:

- get political commitment to include sewage management as development priority;
- support planning for sewage management and behaviour changes; and
- develop monitoring indicators.

Municipal level

The target group are municipal planners, staff of different departments involved in sewage management (such as public works, water, sewerage, education, health), the industrial and the private sector (formal and informal), the political representation (councillors, local chiefs), professional associations, NGOs, representation of the general public. They must be informed of the developments in the sewage sector, the integrated nature of water and environmental sanitation and the necessary elements to effectively work for sewage management improvements, that is a partnership approach to environmental sanitation improvements at municipal and community level.

Messages for this target group include:

- information on current environmental conditions (xx tonnes of waste flow untreated in the river);
- information on current sewage management situation (we produce xx of waste per day and we have trucks to bring this to the city dump);
- health statistics at local level (by area);
- laws are established, but pollution of the environment continues; and
- the importance of stakeholder involvement in planning for improved sewage management.

Aims may include:

- development of monitoring indicators at municipal level;
- development of action plan for environmental management;
- mobilisation of resources, identification of financing sources; and
- priority setting and action planning for behavioural change.

Community level

The in-built contradiction with sewage management comes to the fore at this level. On the one hand, human waste disposal is a very private issue and on the other it is a community issue. Yet, people who have access to sewage facilities and who live in a healthy environment, is what this whole effort is about, even if the ultimate aim is to reduce pollution of the marine environment. It is their needs and their perspectives, which are the most important in programme communication. In this effort the 'public' needs to be segmented in the different kinds of public, living in the different areas that make up one city.

Conditions – such as environmental, economic, social and cultural – must be taken into account in designing any intervention. Communication with communities is necessary for assisting them in the analysis of their own situation, identification of their problems and issues, and mobilisation of resources. This two-way communication is the most profound change that has to take place in most approaches for environmental improvements and is one of the cornerstones for an effective strategy. It is also the most time consuming and the one which can not bear any shortcuts.

The target group at this level include community-level organisations (CBOs) active in the different parts of the city, representation of different segments in the communities (rich, poor, men, women, ethnic groups etc), traditional chiefs/community elders, churches, schools, Parent Teacher Associations, health centres, NGO's and extension workers.

Messages for this target group include:

- citizens have a right to access to sewage systems, adapted to their demand;
- good sewage is important for health and is cost effective (risk of cholera, dysentery);
- a healthy environment creates improved living conditions;
- household access to latrines increases privacy, convenience and safety; and
- we have to safeguard our environment for our children.

Aims may include:

- creating awareness among citizens to pressurise the politicians;
- establishing an effective community level organisation to participate in planning for sewage management;

- mobilise people to construct latrines;
- increase willingness to pay for sanitation;
- monitor environmental changes at community level; and
- Finding the right incentives.

It is unrealistic to expect stakeholders at different levels to become interested in the improvement of sewage management if they do not get anything out of it that they see as a profit. Obviously, such incentives are different for stakeholders at different levels. But it is necessary to find the right incentive for the right target group.

At national level, these may be:

- exposure as a good example at international fora;
- being quoted in the international media and literature; and
- being at a good 'level' in international statistics on health or environment.

At municipal level, these may be:

- elections for the 'sanitation' town of the year;
- access to (regional) training for the municipal engineers or industries that win the election; and
- matching funds for cost recovery.

At community level, these may be:

- nicer environment for living (and sports);
- access to other services (electricity or increased water supply); and
- financial (recycling of solid waste).

5. Setting verifiable goals

Advocacy requires agreements on specific operational goals. These have to be realistic and achievable in a specified time span. A goal such as increasing the sewage treatment in the developing world from less than 10 percent now to 75 percent in 2010 is clearly not achievable, because this would require financing that is simply not available, apart from political commitment to such a cause that is also non-existent. It is best to set these goals with the main stakeholders involved and setting them in such a way that indicators are agreed upon and are verifiable, preferably by those stakeholders who have immediate interest in the issue.

6. Building alliances

Once these goals are in place, the next step is to identify and mobilise potential partners. If there are antagonists, the reason for this has to be found out, as well as the conditions that may turn this antagonism into support. Every stakeholder connected with waste management has to be approached, including legislative bodies, NGOs, industries, religious people, the media, and community and professional groups. All these groups are important for political and financial support. When the alliance is one sided, support for the cause will be lost, as is illustrated by the case below.

7. Conclusions

Advocacy and public awareness raising for behavioural change is more than a one-off campaign in the mass media. Public awareness is only one element in a continuum of a communication process that includes advocacy, social mobilisation and programme communication. A systematic approach to plan and implement a strategy for advocacy and awareness raising will be needed to mobilise different segments of society to support the development of sustainable sewage management. This approach consists of a number of seven components in a process, which can be summarised by the steps and questions below.

- What is the issue? What are we trying to achieve? What behaviour?
- Who are the target groups? To whom? Whose behaviour?
- What are the present knowledge, attitudes, and practices?
- What type of message? Two way
- Who will help in communication? Incentives?
- Are communication materials field-tested?
- What media? Tools
- What are the indicators for results?
- Cost and budget; and
- Revision of programme based on lessons learned.

What is hygiene behavioural change? Which factors induce people to change their behaviour?

For individuals or groups to make a sustained change to their hygiene behaviour, they need to go through several steps:

- Recognizing or acknowledging that a particular behaviour (e.g. leaving children's stools exposed in the living environment) is wrong, or risky, or anti-social and wanting (or accepting peer pressure) to change it;
- Discovering alternative, more suitable, behaviour (putting the stools in a latrine) that is practical and convenient;
- Trying out the new behaviour and assessing the pros (cleanliness, dignity, esteem, improved health) and cons (extra effort, disruption to daily routine, distance to latrine);
- Finding an overall positive benefit from adopting the new behaviour; and

- Before making the actual change, different considerations (own beliefs and values, developed attitude, influence of others, enabling factors) play a role.

When people change, as individuals or through group action, specific factors motivate them to do so. In the table below, four key benefits are listed which have been found to strongly influence hygiene behaviour change. They are:

- *facilitation*, or making good behaviour easier;
- *understanding* in one's own mode of thinking, that the change is better for oneself and for one's family;
- *influence* and support from others, when a new practice is adopted; and
- *autonomy* or the means and control to carry out the practice.

Factors inducing people to change their hygiene behaviour	
Facilitation more on water	• Water sources are closer, supply is reliable and predictable, collection easier and safer. • New facilities to solve excreta disposal problems e.g. lack of privacy, lack of safety, bad smells, flies, workloads of children are solved. • New facilities/services to eliminate solid waste and waste water nuisance from dirt, mud, rats and bad smells are reduced.
Understanding	• People conclude that within their own hygiene perceptions certain conditions or practices are unhealthy or undesirable and should be changed. • People perceive economic implications of unhygienic conditions.
Influence	• People gain prestige from their new behaviour. • Others support the new behaviour/disapprove of different behaviour. • The group/community commits itself to the behaviour. • People agree on specific punishments or rewards.
Autonomy	• Means (time, energy, finances, etc.) for the new practice are available. • The process provides valued skills and resources. • The users are free to use their skills and resources.

Source: Wijk, Christine van Wijk and Tineke Murre (1995). Motivating better hygiene behaviour. Importance for public health. Mechanisms for change (www.unicef.org/programme/wes/pubs/behav/behav.htm). New York, USA: UNICEF.
A copy in Pdf program can be downloaded: http://www.unicef.org/programme/wes/pubs/behav/behav.pdf

It does last! Some findings from a multi-country study of hygiene sustainability

After a hygiene promotion programme ends, are hygiene practices continued in the household and community? A recent IRC and partners study funded by the EU has investigated from 2000 – 2004 this question in eight developing countries and found that hygiene promotion is important and that the changes in behaviour do last.

From Africa were involved:

Ghana	–	Volta Rural Water Supply Programme
Kenya	–	NETWAS International
Uganda	–	WaterAid

From Asia, partners from India, Nepal and Sri Lanka participated.

They shared the results of this study in the only relevant magazine for water sanitation and hygiene in the developing world Waterlines, Volume 22 No. 3 Quarterly, January 2004.

Here is a selection of the results.

Are hygiene behaviours sustained?

The research data demonstrated that hygiene behaviours are sustained beyond the end of an intervention. The issue was investigated from two points of view. If hygiene behaviours were sustained, then we would expect to see that:

Practices would not be more prevalent in communities where the interventions ended more recently (for example, in 2000) than in communities where the interventions ended earlier (1998 or before).

The behaviours continue undiminished through the two data collection periods (i.e. from 2001 to 2002).

Applying these comparisons to the various indicators measured in each country, it was possible to test sustainability for 46 comparisons. Only three of these comparisons suggested a significant decrease in hygiene indicators with time. To summarise the findings:

- only one behaviour (hand washing skills tested in Ghana) was related to whether the end date of the intervention was recent or not; and
- the changes between survey periods (2001 to 2002) were minimal. In Ghana, the provision of soap and water in the household for ease of hand

washing decreased from 2001 to 2002. In Uganda, a proportion of latrines are maintained well.

External variables

A few external variables were investigated as these are often said to determine whether new hygiene practices will be taken up and continued. The variables were:

- access to water through convenient water points (does availability of water result in improved hygiene?);
- educational level of women (are better educated women more likely to adopt hygiene practices?); and
- the socio-economic status (SES) of the community (is hygiene better in richer communities?).

The results show that access to water does not determine behaviour. The results indicated only one statistically significant relationship between the provision of water sources close to the homestead and good hygiene behaviour. This confirms that merely providing convenient sources of water is not sufficient to induce good hygiene.

Practice, in other words, water and sanitation programmes that focus exclusively, or largely, on construction will probably not lead to sustained hygiene behaviours.

The study also shows that the education level of women was a determinant of hygiene behaviour in the Kenya and Nepal studies where it was investigated. There is a very strong relationship between the education of women and their hygiene knowledge, skills and behaviours. This means more-educated women do better in adopting hygienic practices. Stronger hygiene interventions (i.e. more inputs, time, efforts to reach the harder-to-reach and strategies suitable to the less educated) are needed if more of the less-educated women are to do better in adopting hygienic practices.

What types of hygiene interventions are most effective?

We also investigated the impact of hygiene promotion activities on hygiene outcomes, by looking for associations between each household's contact with such activities and its hygiene indicators. This was done by comparing communities where intervention took place with control groups (Kenya, Sri Lanka),

and also by comparing similar communities having different types, or different lengths of intervention (India, Nepal). Three studies involved longitudinal comparisons of the same communities.

Hygiene promotion is usually carried out through a combination of actions such as:

(a) mass activities (campaigns, drama, videos, camps, rallies, village councils),
(b) group activities such as meetings and formation of women's groups,
(c) formal training classes and
(d) through personal communication.

In these studies, home visiting was the major form of personal communication. Home visits and group activities were organised both by members of the community and also by project field workers. The researchers in India and Ghana indicated that home visits and small group meetings were more frequently carried out by members of community groups (water committees, women's groups, local professionals).

The data supports this approach. All four main categories of activity were found in one setting or another to have an impact upon hygiene. In addition to the quantitative results focus group discussions in Nepal pointed strongly to the importance of small group meetings with field staff in stimulating and sustaining new behaviours. The Indian data set, which allows particularly detailed analysis of this issue, shows how small group meetings are sufficient to encourage people to keep their courtyards swept, but that the more intense contact provided by a required to bring about more demanding changes in practice, such as regular hand washing and consistent use of a latrine.

The need for more intensive contact for more demanding changes in behaviour is also supported by the data from Ghana, where the 'less prevalent' behaviours (those practised by the fewest households) were the only behaviours in each cluster that were significantly associated with home visits. Home visits were related to having the recommended dipping cup,

storing soap and water near each other, and (a logical consequence) being able to get hand washing materials together quickly. However, the data also indicates that no single approach is likely to be sufficient. In India, for example, the home visits were part of a deliberate gender sensitive strategy to reach women. However, if the men folk are likely to be absent during such visits, other approaches are needed to complement the home visits and ensure that the whole target population is reached successfully.

In summary

In spite of the diversity of countries and study designs, there were a number of common themes in the general findings. We believe that these general findings can be judiciously extended to other developing countries. It is not inevitable those behaviours will fade or that as years go by people will revert to earlier, less hygienic practices. However, in water and sanitation programmes, continued access to services is not enough to sustain hygienic behaviour: it is the so-called 'software' aspects of the programme that are more important. Thus hygiene promotion and education should not be low-visibility 'add-ons' to water and sanitation programming. Sustained behaviours result from giving high priority and adequate resources to hygiene promotion and education.

Project variables determine hygiene behaviours. These include: the intensity of the programmes, support from influential groups in the local community, attendance in hygiene classes and training. The studies show that intensive hygiene promotion interventions, including small groups and personal contact, will probably have a tangible and sustained impact.

Last but not least, our study shows that practitioners in the field can carry out high-quality research on globally significant issues and deliver results that are of value not only to the projects on which they are engaged, but to the billions who lack water, sanitation and hygiene throughout the world.

Unit 2

Introduction

Human behaviour is complex and depends on a wide range of factors. Behaviour change is a multifaceted field, particularly where there are many different perspectives on the problem, as is the case with water, sanitation and hygiene education. Implicit in the concept of behaviour change is the concept of learning. Learning changes you, and equally, change requires learning. Clearly having the knowledge of what you want to do involves learning. If a person is changing their behaviour, it is because of new learning that requires them to adapt. However, sustainable behaviour change goes beyond acquiring new knowledge. For behaviour change to have a greater chance of being enduring and perhaps permanent attitudinal changes must also be part of this process. The Human Values in Education in Water, Sanitation and Hygiene Education offers another dimension to change. The values that are universal and central to all people's lives are used as core building blocks to create a new Water, Sanitation and Hygiene Ethic.

In this presentation, some of the popular approaches to behaviour change are briefly discussed as these are useful starting points in understanding behaviour change. An exposition of the human values approach to character development and behaviour change follows.

Learning and behaviour change

Behaviour change and learning have much in common, but they are not quite the same thing. Nonetheless, learning is vital if people are to change their behaviour. As Kilvington & Allen (2001) suggest:

Behaviour change = Knowing what to do + Enabling environment + Imperative. Learning is important in all three parts of this behaviour change equation.

Working out what to do requires people to learn about the situation. Learning is important for understanding how the social and physical environment can support behaviour change, and learning may be important for developing the motivation (imperative) for making the change. Understanding environmental issues may provide some motivation (imperative) for acting differently with respect water usage, hygiene habits and sanitation practices, for example.
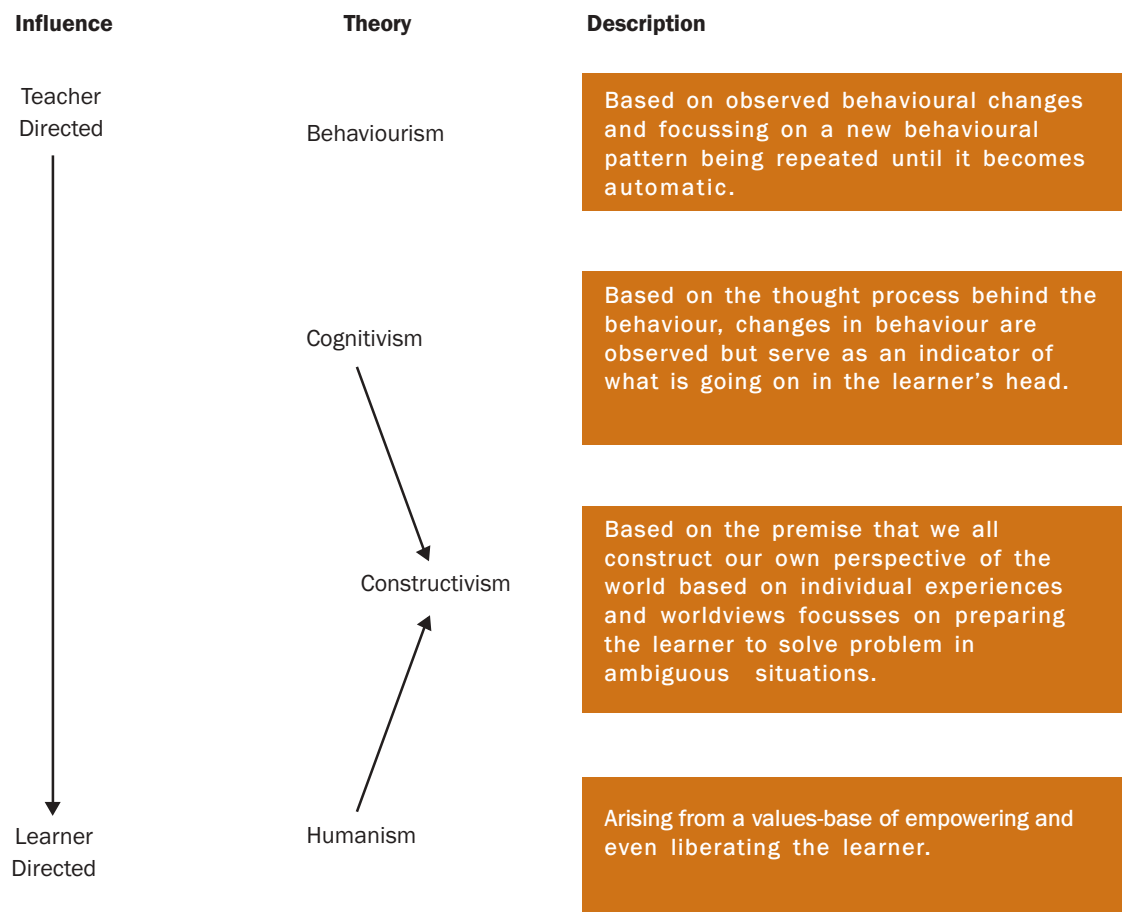
Learning means different things to different people. Studies done on how learners understand learning show that as people learn, they come to understand it differently. Early on, learners think of learning as a way to 'know a lot'. Hence, the teacher has the information and the learner has to acquire and memorise it. After a while, learners start to understand learning as being about acquiring new skills and methods. Here the learner is trying to learn new ways of thinking and doing. Knowing 'facts' is secondary. Advanced, reflective learners come to see learning as about understanding the world through reinterpreting and integrating knowledge (Belenky et al. 1986). These observations indicate that learners at different levels of understanding have different needs. Initially the learner learns the facts of washing hands before eating. When the learner washes his or her hands these skills are practised. Reflexive learners do this automatically and are able to solve problems building on the knowledge and skills developed e.g. if no water is available at the toilet, the learner goes out in search of water before handling food.

Theoretical perspectives

Understanding some of the theories of learning and behaviour change will offer more insights. The following model is a synthesis of the predominant psychological theories that underpin learning.

Figure 1

Influence	Theory	Description
Teacher Directed	Behaviourism	Based on observed behavioural changes and focussing on a new behavioural pattern being repeated until it becomes automatic.
	Cognitivism	Based on the thought process behind the behaviour, changes in behaviour are observed but serve as an indicator of what is going on in the learner's head.
	Constructivism	Based on the premise that we all construct our own perspective of the world based on individual experiences and worldviews focusses on preparing the learner to solve problem in ambiguous situations.
Learner Directed	Humanism	Arising from a values-base of empowering and even liberating the learner.

Behaviourism

In behaviourism, learning is seen as the conditioning of human behaviour through habit formation. Behaviourists see people who can be conditioned to behave in particular ways with the right use of rewards and/or punishments (Skinner 1972). Behaviourism implies the dominance of the teacher, with learners characterised as essentially passive. Behaviourism is an important aspect of parenting, when adults train children to behave in particular ways through the consistent use of either punishment or reward. They also underlie policy mechanisms such as fines and incentives. A parent may discipline a child when s/he leaves the tap open when brushing his or her teeth. Alternatively the parent may reward the child with a chocolate when the child turns off the tap.

Cognitive approaches

Cognitive psychologists, in contrast to behaviourists, are more concerned with the processes and structures inside people's brains. They deal with perception, seeing the brain as continuously categorising inputs from experience and, in turn, interpreting experience in terms of the categories that are developing. This process is an ongoing one in which the patterns in our brains are constantly affecting what we perceive, and what we perceive is constantly affecting the patterns in our brains (Atkinson et al. 1993). In contrast to the behavioural perspective, the cognitive school focuses more on the learner as an active participant in the teaching learning process. Cognitive-based teachers instruct students by using teaching strategies that help the learner acquire knowledge more effectively. When teaching the impact of pollution on water bodies the teacher may decide to ask the learners to work on a project to identify the causes of pollution in a nearby stream or river.

An important influence in cognitivism was the work of Jean Piaget who observed that children go through stages that appear to be linked to the maturity and development of the brain. A related concept is the idea of styles of learning, in which individuals are seen to have different learning styles and to be at different stages in a learning continuum (Atherton 2001).

Constructivism

Constructivism is an approach that has emerged within the cognitive school of thinking and it underlies much work currently undertaken in the field of education and social psychology. Constructivism (Kelly 1955) adds the notion of 'context' and process to understanding behaviour change. The essence of constructivism is that people are active sense-makers who are continually assessing their environment and acting according to the ways in which they interpret the situation (Ross & Nisbett 1991; Allen et al. 2001). This perspective highlights the fact that people may react to the same information in very different ways. Importantly, constructivism sees learning as an internal process of interpretation, rather than a process of knowledge transmission.

An individual's behaviour emerges from the sense that they have made of what is happening, their ideas about what should happen, and what might happen if they change their behaviour (Ross & Nisbett 1991). Individuals use a wide range of information to develop their understanding of a situation. However, for them to engage with the information in the first place it must be both credible and relevant (Reynolds & Busby 1996). Credibility is not always to do with the scientific quality of the information. It is often more to do with the qualities and credentials of the person from whom it comes. Thus, learners are more likely to listen to other learners, or to people that they know well and whom they trust. The human values approach uses group activities which promotes child-to-child learning as peer influence is an opportunity to use to promote the new water, sanitation and hygiene ethic we are promoting. Role modelling is another avenue of facilitating behaviour change e.g if a teacher ignores a leaking tap, children are likely to emulate this behaviour.

Humanism – Human values approach

This perspective is driven largely by liberal values. It tends to prescribe what should happen rather than describing what does happen during the learning process. Humanists assert that everyone has a natural desire to learn and that learners need to be empowered and to have control over the learning process. This means that in an ideal world the teacher relinquishes a great deal of authority and becomes more of a facilitator (Atherton 2001). Humanists are especially concerned with creating an

educational environment in which learners can reach their full potential. The school climate is powerful tool for character building and promoting appropriate water and sanitation behaviours. The parents, teachers and administrators must all model good human values if the human values approach to water, sanitation and hygiene education is to succeed.

A synthesis of learning theories

In behavioural theories, knowledge is viewed as nothing more than passive, largely automatic responses to external factors in the environment. In cognitive theories, knowledge is viewed as abstract symbolic representations in the head of individuals. In the constructivistic theories, knowledge is viewed as a constructed entity made by each and every learner through a learning process. Knowledge can thus not be transmitted from one person to another; it will have to be reconstructed by each person. This means that this view of knowledge differs from the 'knowledge as given and absolute' views of behaviourism and cognitivism. Thus, the cognitive-constructivistic perspective is beginning to underpin contemporary efforts to help people learn about, and change their behaviour towards, the environment.

Teaching therefore is the process that supports this construction and reconstruction of new knowledge, rather than being the communication of knowledge.

This research suggests that approaches to facilitate behaviour change are most effective when used to enhance constructivistic or learner-centred instructional strategies because they emphasise interactivity, and learner control and engagement. The implication for teachers is that an eclectic approach which embraces human values as a catalyst for behaviour change, has a greater impact than any one theory. Flexibility and ability to adapt to various circumstances would facilitate behaviour change.

The usual frameworks about thinking of behaviour change

- Individual practices unhealthy, or unsafe, behaviour;
- Program "intervenes" by interacting directly with that individual;
- The individual moves to practice only healthy, or safe, behaviour;
- Problems with some common ways of thinking about behaviour change;
- It assumes behaviour change only has to happen once. But people do not just change once. Teachers may need to repeat lessons in hygiene education to reinforce old learning;
- It assumes people all change at the same time; and
- It does not explain how people can adapt their "new" behaviour in response to changing circumstances.

It assumes others determine the most important decisions about behaviour change, not the people wanting to change e.g UN-HABITAT wants to change the ways people react to water usage, sanitation practices and hygiene habits.

Models of learning and change

Kolb Learning Cycle

Kolb (1984) was interested in experiential learning and his learning cycle is one used in a wide range of learning or behaviour change contexts. Kolb thought of learning as an ongoing process – a continuous series of cycles. Each cycle contains four stages.

This learning cycle is the basis of the 'action research model of learning', where individuals, groups or

change and they seem to be particularly popular in the health field.

It is important to remember that this model is not suggesting that behaviour is a linear process. People can be expected to revert to an earlier stage in the process when initial change attempts cannot be maintained and a new attempt at change must be made. Children may forget to wash their hands and may slip back to old habits. This means that behaviour change processes might be seen as
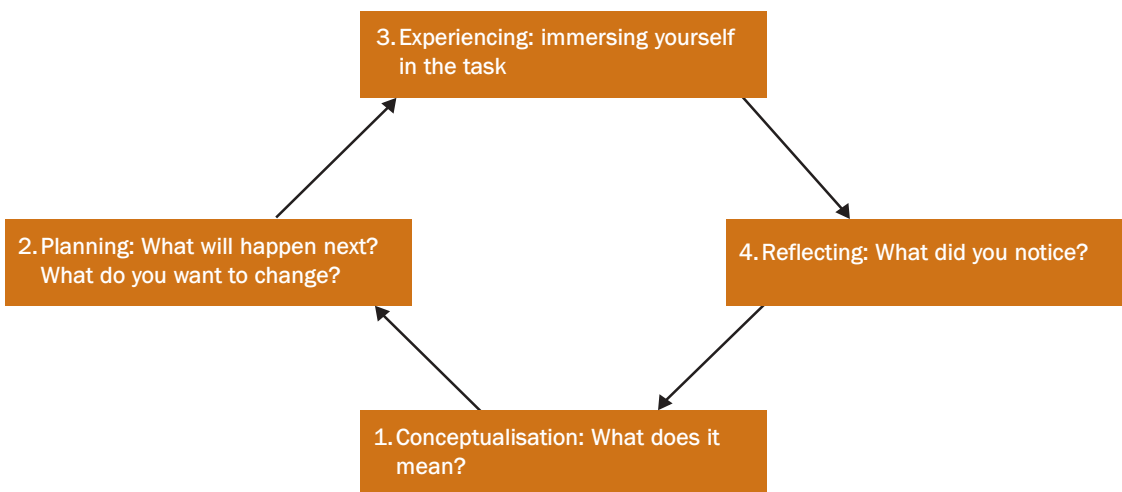
organisations follow a series of cycles in which they plan, act and reflect. A mother learns that water should be purified before consumption. She then decides to boil the water first (planning). She then boils the water and gives the cooled water to her children to drink. (Experiencing). She notices that her children don't get sick when they drink this water. She then realises that by purifying the water she has got rid of harmful bacteria (reflection). She decides to find out different ways of purifying the water for example solar treatment (conceptualisation).

Prochhaska, DiClemente and Norcross Transtheoretical Model of Change

The 'stages of change model' came out of researchers studying the effects of behaviour change programmes in the health sector. This model (outlined in Table 1 indicates that there are stages of change that all individuals go through in any change process. Models such as this are used to understand what processes are necessary to support behaviour

several loops in a behaviour change spiral. An individual may go through one behaviour change process before reverting to the contemplation or determination stages and beginning the process again from that stage. For example children may be reminded by the teacher that they should be washing their hands. This process of change and reversion may have to occur several times before a change can be maintained. In the example given earlier children may wash their hands every time without being reminded.

This model also highlights the importance of learning at all stages of the process. Seen as a series of spirals, oscillating between contemplation and maintenance, it highlights the similarities between this stage-theory of behaviour change and the learning cycle outlined above. In the case of behaviour change it appears there might be more of an end point when maintenance is achieved.

Table 1

Concept	Definition	Important processes	Example
Pre-contemplation	Unaware of the problem, hasn't thought about change		Defecating near the local river and is unaware of cholera.
		Becoming aware, Emotional response, and Environmental analysis	Lesson in class, embarrassed, and impact on the river.
Contemplation	Thinking about change, in the near future		
		Thinking through the issues	How cholera is caused.
Decision/ Determination	Making a plan to change plans, setting gradual goals	Seeing other options	Thinks about alternatives
		Self-efficacy social support	Believes that old behaviour can be changed
Action	Implementation of specific action plans		Now defecates in the bush. Covers excreta with soil.
		Helping relationships	
Maintenance	Continuation of desirable actions, or repeating, periodic, recommended step(s)	Reinforcement, seeing other options, and being in control social support	Teacher reinforces behaviour by praising. Friends also practice acceptable sanitation habits.

F Ask the participants to reflect on a personal behaviour change and answer the following questions.

Reflect on a change that you had to make.

- **What was the change?**
- **How did you start to implement the change?**
- **What strategies did you use?**
- **What challenges did you encounter?**
- **Did you relapse to old behaviour?**
- **What factors supported the change?**
- **Was the change permanent?**

Ask a few participants to share their experiences with the group.

Unit 3

Start the Unit with a self-reflection activity. Ask the participants to reflect on what they think values are and what values do they consider to be important. Ask the participants to write down one value on a strip of paper. An A4 page could be divided into four quarters and each participant could be given one strip. The values that are identified will be used in the next module.

Activity: Self-reflection
Write down:

• What you understand by the term values?
• What values do you consider to be important and why?
• Identify the national or constitutional values of your country.
• What values would you like the children of your country to grow up with?
• Identify a value that starts with the first alphabet of your name e.g. Helpful Harry, Kind Keziah, Patient Pireh, Astute Andre, and Enthusiastic Eric etc.

Invite a few participants to share their values and why they are important to them.

Human Values as the foundation for sustainable behaviour

This approach sees values that are essential for good living as being an integral part of oneself and that all human beings are capable of accessing these values that reside within them. In behaviour change management the facilitator through modelling good values, and creating a climate that is conducive for character development draws out the values through a learning process described as elicitation. This is the meaning of the term education, which is described as "educare" (Latin), which means drawing out, or bringing out.

It is essential that education combine skills and knowledge development with values. The following model looks at the relationship between knowledge, skills and values:
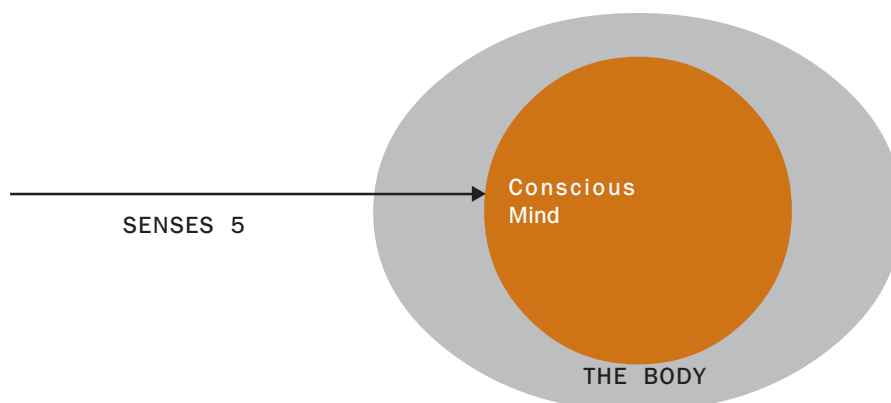
1. People with low values and low skills are harmful and are not useful in society.
2. People with strong values and high in skills are best.
3. People with high skills and low in values are dangerous.
4. People with strong values and are low in skills are trainable.
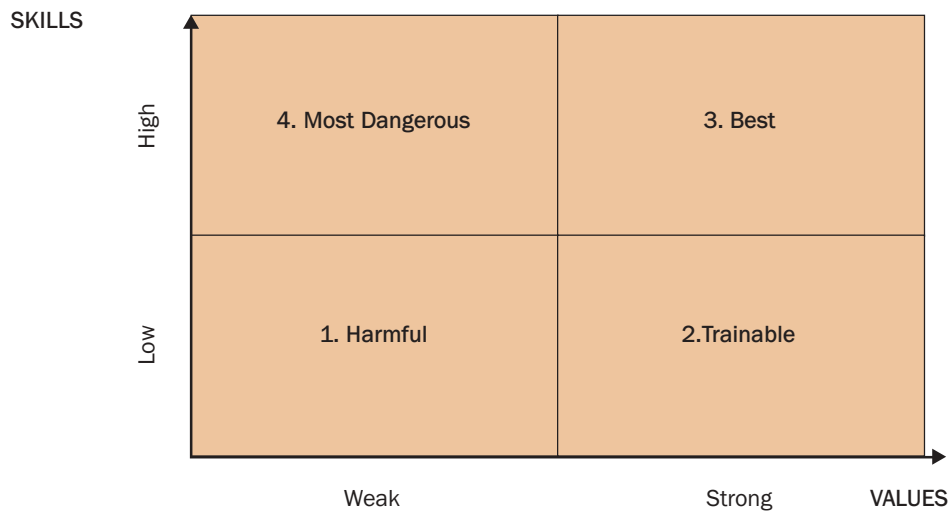
The mind

By skilling knowledge with the integration and elicitation of human values, behaviour changes as manifested in character transformation are permanent. Education is seen as a process that moves from information to transformation. In this presentation, the work of Dr. Art Ong Jumsai will be explored along with the notion that an enabling and positive school climates lead to character development.

Human beings learn through the process of interacting with the environment through the five senses. Researchers have explained that the brain processes the stimuli received by the sense organs. The following model illustrates this process:

Sub-conscious mind

Whatever has been seen, heard or received through the sensory organs, whatever we have felt emotionally, experienced, thought or done through various actions, and whatever have been our environment in our past, all are stored in our sub-conscious mind. The sub-conscious performs function similar to the memory in the computer. It stores data, information, past events, and programs. A new program can be installed in the sub-conscious through various means such as seeing or hearing something repeatedly, saying something verbally or mentally repeatedly, or performing an action

SENSES 5 → Conscious Mind

THE BODY

The mind has three aspects:

1. Sub-conscious mind
2. Conscious mind
3. Super Conscious mind

repeatedly. Behaviours and attitudes can be changed by the application of a new programme installed in the sub-conscious. Peale wrote a book on the power of positive thinking (Peale, 1989). Whatever we think, so we become. Every time you encounter a message at the tap stating "Water is Precious, Don't waste it", this message is stored in the sub-conscious mind. By seeing this message repeatedly, the conscience directs the individual to use water wisely e.g. at the Kibuli Primary Teacher's College one student said that his conscience was troubled by the water slogans to the extent that he decided to change his wasteful habits.

Conscious mind

We need to consider the function of the conscious mind as well. The conscious mind is that part of the mind that we are aware of. We use it to think and make decisions. In order to have awareness the conscious mind must learn to concentrate on the stimuli. Without concentration the learning process will not take place effectively. When faced with the choice of emptying vessels that contain water which are breeding sites for mosquitos, the conscious mind thinks. It is going to take a lot of effort and requires the sacrifice of missing the soccer game. The mind then draws on the sub-conscious memories and realises that malaria is a killer. The conscious mind may decide to forego the soccer match and clear the containers.

Super conscious mind

It is found that the conscious mind becomes calm, peaceful and does not react emotionally to various stimuli as before. The ability to concentrate is improved and memory is enhanced, as a result there is an improvement in the learning process. Training children in the art of concentration and meditation would speed up the transformation. It is now that the super-conscious starts to come into play. The conscience within the children will start to teach and guide them to act in the right way, to do only what is good for themselves and to others. A new type of learning has started. Knowledge and understanding are gained intuitively without having to use the conscious mind. In fact, the conscious mind needs to be stilled and completely calm for intuition to occur. Many great discoveries in the past have been achieved when the mind is calm. Sir Isaac Newton discovered the law of gravity while sitting quietly under an apple tree when and apple fell down on his head. As a small child, Newton used to sit quietly alone by himself under an apple tree. This became his habit as he grew up. The human value gained through the development of the super-conscious is the understanding of the "TRUTH". In the context of water, sanitation and hygiene the individual may acquire insights when they least expect it e.g. finding alternative and cost effective methods of teaching water education in the absence of expensive laboratory equipment. The teacher may use old plastic bottles as beakers and may use old cloth as filter mechanisms instead of filter paper.

The following diagram illustrates the concept of the sub-conscious, conscious and super-conscious minds.
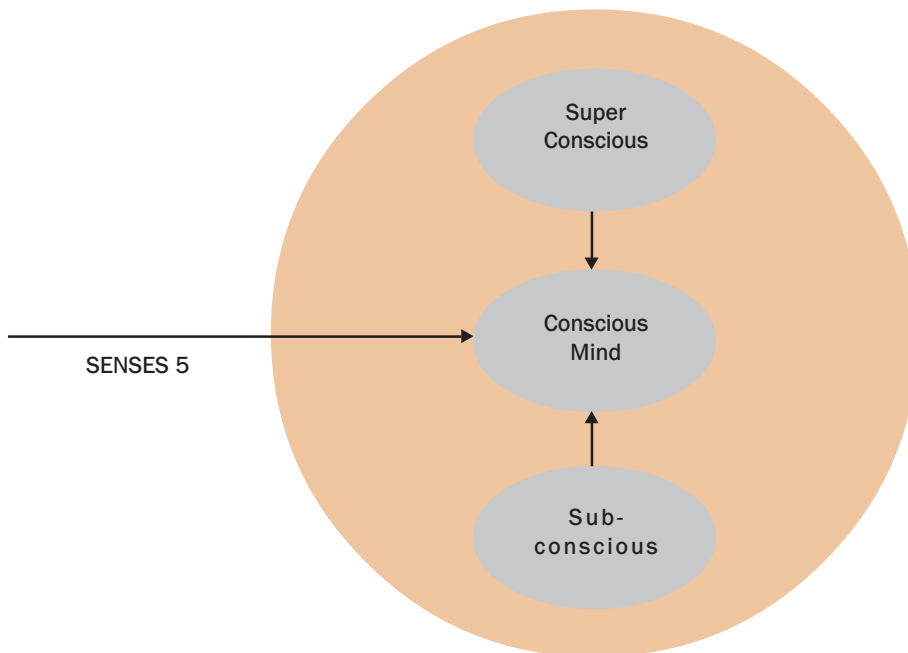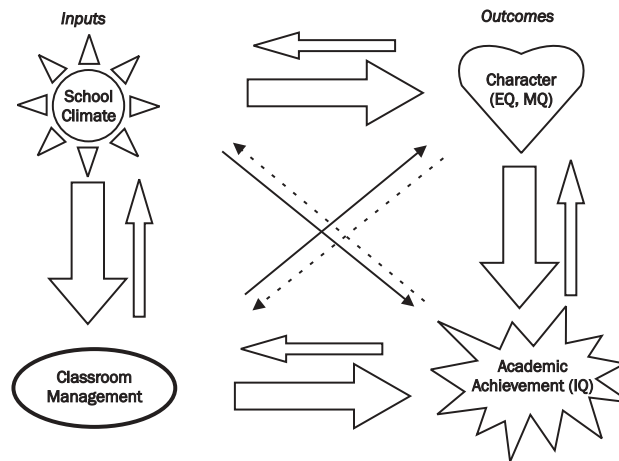
The school climate

From the study of Dr. Teerakiat Jareonsettasin on School Effects on Children's Development, four key areas (inputs and outputs) were identified that have effects on one another (Jareonsettasin, 2000). The starting point is the school climate or atmosphere. If the atmosphere of the school is full of peace, love and compassion, it will lead to the output desired of good character with high EQ, emotional intelligence and MQ, moral intelligence. At the same time, teachers will feel at peace and the school climate will enhance classroom management. With good classroom management, this will lead directly to academic achievement. An important discovery is that when students have good character (high EQ and MQ), this will also lead directly to academic achievement. In the following figure, the size and direction of the arrows indicate the magnitude of influence and directionality.

Thus, the first step in the application of the model is to create an appropriate school climate that will help in the transformation of teachers and students as well as the staff in the school. This involves the proper objectives for the school, the school mission, the leadership, the policy and vision of the management,

the morale of staff and teachers, parents' and students' participation. In fact, all the steps in the Human Values Integrated Instructional Model will all contribute to the school climate. The parents, teachers and administrators must all model good human values if the human values approach to water, sanitation and hygiene education is to succeed. Every influential person must live the human values in the school and inspire the learners to do so. "As is the water in the tank, so is the water in the tap," says Sai Baba, a sponsor of a large water supply project in India.

Conclusion

The Human values approach to behaviour change is adding another dimension to the learning process. It takes it a step forward by asserting that acquisition of knowledge and information is not enough to lead to sustainable behaviour changes. Transformation begins when the individuals value systems which have been nurtured in the sub-conscious mind shapes decision making. It is the application of human values to water, sanitation and hygiene education that will lead to the new ethic that the programme is striving to achieve.

Group Activity

Examine the school climate model and look at the possibility of applying it to your demonstration school or college of education. Identify steps to transform the school/college climate. Ask each group to assign a scribe and reporter. They will be given five minutes to present their key ideas.

Ask each group to present a report on their group's discussion.

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