

Water supply and sanitation access and use by physically disabled people

Report of field-work in Cambodia

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Glossary

AD	assistive device
ADL	Activities of daily living
CBR	community based rehabilitation
DPO	Disabled people's organisation
INGO	international non-government organisation
krama	traditional scarf /towel worn by both men and women on the head, and by men around the waist to bathe. Also used to carry babies on the back, catch fish, make a hammock for babies, etc.
NGO	non-governmental organisation
OT	occupational therapist
RWSS	Rural water supply and sanitation
SCI	spinal cord injury
WATSAN	water and sanitation
WEDC	Water, Engineering and Development Centre
VAP	Village Action Plan
VDC	Village Development Committee
~	approximately

Acronyms - organisations / programmes

AFD	Agence Française de Développement
CABDIC	Capacity building of people with disabilities in the community
CDDF	Cambodian Disabled People's Development Federation
CIOMAL	Comité International de l'Ordre de Malte pour l'Assistance aux Lépreux
CRC	Cambodian Red Cross
DAC	Disability Action Council
DFID	Department for International Development, UK
GRET	Research and Technological Exchange Group
HAI	Help Age International
HI-B	Handicap International Belgium

HI-F	Handicap International France
IDE	International Development Enterprises
JICA	Japanese International Co-operation Agency
JS / JRS	Jesuit Services / Jesuit Relief Services
MIME	Ministry of Industry, Energy and Mines
MOSALVY	Ministry of Social Affairs, Labour, Veterans and Youth
MRD	Ministry for Rural Development
PFD	Partners for Development
PLD / PLG	Partners for Local Development / Partnership for Local Governance
PRC	Provincial Rehabilitation Centre (in Siem Reap, Kampong Thom and Banteay Meanchay)
RDI	Resource Development International
SCDPA	Save Cambodia Disabled Peoples Association
Seila Programme	Government programme implementing decentralisation through establishment & capacity building of Commune Councils
Seth Koma	Community Action for Child Rights, UNICEF Programme
VI	Veterans International
UNICEF	United Nations Children's Fund

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1. Introduction

1.1 Project Background

This report has been produced as part of phase two of KaR (Knowledge and Research) project R8059: '**Water supply and sanitation access and use by physically disabled people**'. The research is funded by the UK Department for International Development (DFID) and is being carried out at the Water, Engineering and Development Centre (WEDC), Loughborough University, UK, together with collaborators in the UK, in Cambodia, Bangladesh and Uganda. The project web-page is

<http://www.lboro.ac.uk/wedc/projects/auwsfpdp/index.htm>

As part of Phase two of the research, in-depth fieldwork is to be carried out in four low-income countries. Criteria for selection of fieldwork locations are:

- Availability of current information about multiple examples of good practice on access for disabled people to water and sanitation.
- Commitment/interest from a local partner.
- Support/approval of a local disabled people's organisation (DPO).
- Contribution to a diversity of cultural and geographic contexts.

Cambodia was the third fieldwork location for this research project.

1.2 Purpose of fieldwork in Cambodia

Fieldwork in Cambodia had two main aims:

1. To observe and document examples of existing facilities, adaptations, equipment, activities, approaches and strategies that have helped children and adults with physical limitations improve their access to water and sanitation. The focus was on examples and ideas that others could learn from, and replicate or adapt according to their own needs and situation. Contributors to the research included both disability sector agencies, and those involved in water and sanitation (WATSAN) policy and service delivery, with a view to developing an overview of current policy and practice in addressing the needs of disabled people within mainstream programmes, and to develop strategies for promoting practical change.
2. To generate solutions to problems facing disabled people in accessing WATSAN, through discussion and problem-solving with disabled people. This was envisaged as a way of providing additional information to remedy some of the gaps in existing data, as it was not envisaged that the limited amount of data expected from Cambodia fieldwork would do this.
3. To field-test materials developed by this research project, based on data collected so far. Feedback from informants on a collection of images and

design ideas would provide information which would subsequently contribute to developing the guidelines and final outputs.

1.3 Methodology

1.3.1 Discussion process

On the basis of several pieces of relevant information received about examples of good practice, a preparatory visit was carried out to Cambodia in May 2003, hosted by the Disability Action Council (DAC) in Phnom Penh (see Appendix A1 for report). The purpose of the visit was to decide whether or not Cambodia would be suitable for in-depth fieldwork. Meetings were held with relevant agencies to introduce and discuss the research project, and to identify potential informants and field-visit locations. This visit also provided the opportunity for agencies to express an interest in collaborating in the project. Support and the active involvement of DAC, and a number of local NGOs and DPOs were gained.

Mr Pen Mony, the Technical Co-ordinator of Community Work with Disabled People Committee and Ms Punya Droz, Public Relations and Information Officer of DAC, assisted the research team to prepare for the two-week period of field-work in August, including co-ordination of an introductory planning meeting on the first day of fieldwork, which was held at the DAC offices in Phnom Penh.

At the planning meeting, interested participants from local partner organisations drew up a list of possible visit locations and key informants, which formed the basis for a schedule of visits over the two weeks. These partners continued to be involved in the process of identifying, arranging and hosting visits to disabled people in their homes and to institutions. They were also involved as key informants, as interpreters and in facilitating links to other organisations.

1.3.2 Data collection

Data collection frameworks, developed during the first two fieldwork visits in Uganda and Bangladesh (Jones & Reed, 2003a, 2003b), formed the basis for data collection in Cambodia, with minor revisions to reflect the difference in context. See Appendix A2 for data collection frameworks.

Two main types of visit were carried out, for which different frameworks were used:

a. Family homes and institutions:

The focus of these visits was on facilities, adaptations and equipment, how a disabled person could use them, and what benefits they had brought to the

disabled person and their family. (See Appendix 3 for criteria for selection of field-visits). Data was collected through:

- Semi-structured interviews with informants - disabled people, family members and neighbours as appropriate.
- Observation and documentation of equipment and facilities, including drawings, measurements, photographs.
- Observation and documentation (written and photographs) of how a disabled person used particular equipment and facilities to carry out daily activities related to water and sanitation., including the informant demonstrating and explaining their use.

The following data collection frameworks were used: '1a. Household visit – interview with disabled person', '1b. Household visit – interview with carer', and '2. Accessible facility' (see Appendix A2.1, A2.2, A2.3)

On these visits, two or three data collectors including one or two WEDC staff members and one interpreter, worked as a team, alternating roles of lead interviewer, and data recorder. The translator and documenter could ask additional questions where they felt there were still gaps in information.

b. Visits to organisations/service providers:

The focus of these visits was to learn about approaches to WATSAN service delivery and institutional factors that affect implementation. The research team interviewed informants from disability sector agencies and WATSAN service providers and the organisations that support them, such as NGOs, international NGOs (INGOs) and donors. Data was collected via semi-structured interviews, usually in English, but occasionally through an interpreter. The data collection framework '3. Service provider/structure' was used (see Appendix A2.4).

Mr Pen Mony, DAC staff member, specialist in community development with disabled people, who is himself disabled, was overall adviser to the team, as well as acting as facilitator and co-researcher for a number of the field visits and meetings. Mr Sam Roth Keo, who also has a background in working with disabled self-help groups, provided translation and support, and useful guidance to the team throughout the visit.

Selection of the field visits, either to homes or to institutions was largely opportunistic in the way that contacts were made. An effort was made to ensure a balance of visits in terms of type of facility/ adaptation, the range of impairments which people had, and to both disabled women as well as disabled men.

The research deliberately focused on examples of good practice, and so findings do not in any way represent the typical situation of most disabled people in Cambodia.

Role of local collaborators

In view of the lack of availability of people with relevant data collection skills, and the limitations experienced in Bangladesh with training and supporting local data collectors in such a short time-frame (Jones & Reed, 2003b), it was felt that the best use of time was for the WEDC team to take primary responsibility for all data collection, with local collaborators in a supporting role.

Disabled people were involved throughout the process of research, in discussion and consultation, in advising on methodology, selection of informants and examples, in data collection, analysis and feedback. Out of over 100 contributors, 22 were disabled.

1.3.3 Generating solutions through discussion

Problem-solving discussions together with disabled people took place twice. On both occasions the starting point for discussion was their ideas on how their existing WATSAN facilities could be improved to better meet their needs. The process followed with the DPO was as follows:

1. DPO representatives presented their ideas for modifications / designs.
2. DPO members and researchers discussed each idea in turn, and using a process of question and answer, added and modified a few ideas.
3. DPO members looked through examples of photos and drawings collated from previous fieldwork (see Section 1.3.4) and discussed further ideas.

With the individual disabled person detailed discussion was not needed, as she already had a clear idea of what she needed, and the discussion process was already under way with the social worker.

It was felt unethical to spend time discussing solutions with disabled people, and then not to provide support for a solution. For this reason, support was offered to seek funding for ideas generated. It is expected that the adaptations/solutions generated will be put into practice, with support from relevant organisations as required.

1.3.4 Field-testing materials

This took the form of a fairly informal discussion held with a group of disabled people from a rural DPO. Two folders with photos, drawings and diagrams (with no captions) were shown to 2 groups. They were given about 10 minutes to look through the photos, focussing specifically on those related to water points and toilets (because this was the focus of their interest). The images provoked much interest and discussion within the groups.

This was followed by discussion with the group as a whole. Researchers first invited general comments and questions about the images, then asked more specific questions on particular aspects of the images.

1.4 Field visits

Field-work took place over a two-week period, from 3rd to 15th August 2003, carried out by the WEDC research team. It was not possible to cover all suggested visits in the limited time available, but the team attempted to balance the type of visits and meetings to ensure as wide lesson learning as possible.

Criteria for selection of field-visit locations can be summarised as:

Accessible facilities, adaptations, equipment, approaches and strategies that have helped people with physical impairments and limitations improve their access to water and sanitation-related activities. Informants working in WATSAN service delivery, planning and support, with relevant experience to contribute into the current situation. See Appendix A3 for the criteria in more detail.

A total of 41 visits and meetings were made. See Appendix A4 for the timetable of visits.

1.4.1 Contributors

Over 100 people contributed to the research, through interviews, meetings, telephone conversations or e-mail correspondence (see Appendix 5 for the complete list). They were from government and NGOs, including DPOs and international organisations. 25 contributors were disabled, of whom 2 were children.

Table 1. Number of people met.

	Female	Male	total
Disabled adults	6	17	23
<i>(including disabled elderly)*</i>	<i>(0)</i>	<i>(1)</i>	<i>(1)</i>
Disabled children	1	1	2
Total disabled people	7	18	25
Carers	7	4	11
<i>(including child carers)</i>	<i>(1)</i>	<i>(2)</i>	<i>(3)</i>
service providers (non-disabled)§			61
Family members and neighbours	6	-	6
Total non-disabled people			78
Total number of people	30	73	103

* Brackets indicate the group is a sub-set, i.e. included in the group above.

§ some of the disabled people met were involved in service provision.

1.4.2 Types of impairment:

23 out of 25 disabled people had a physical impairment, including amputations mainly due to land-mine injury, cerebral palsy, damage due to leprosy or polio,

and spinal cord injuries. Four had visual impairments and one had speech impairment. Some had more than one impairment.

1.4.3 Visit locations

Table 2. Type of visits.

	Total
Family homes of disabled people.	10 (all rural)
Institutions – schools, rehabilitation centres for disabled people.	3

It is appropriate that three times as many family homes as institutions were visited, as the focus of the research is on the household context.

Table 3. Type of organisations met.

Organisations visited / discussions held with	WATSAN	disability	other	Total
Government offices/ services	4	4	2	9
Organisations which are not government, i.e. NGOs, INGOs, church organisations, DPOs, etc)	15	16	1	31
<i>(including DPOs)</i>	-	(5)		(5)
Donors	5	2	4	10
Private Sector	1			1
Number of organisations	25	22	7	44

Note that some of the organisations visited came into more than one category.

Table 4. Local and international organisations.

Local organisations	International organisations
12 (excludes 9 government organisations)	22

1.5 Limitations and gaps

1.5.1 Data collection

Limited time in the country meant that it was not possible to follow up every contact and visit every example that the team received information about. Remote rural locations were avoided because of the length of travel time needed, but in fact it is in these remote border areas where there is the highest prevalence of disability due to landmine injuries, and thus where the

most work has been done to provide accessible facilities (see Appendix A6 for map of Cambodia).

Visit selection was largely opportunistic, and it was difficult to keep a balance in terms of impairments, gender and urban/rural locations. The majority were men with a physical impairment acquired as an adult, who could walk and were articulate. It is recognised that their needs and views are not necessarily representative of all disabled people. Data was all from rural areas because no examples of good practice in poor urban areas were identified.

The limitations of working through an interpreter will inevitably have led to misunderstandings, and a loss of accuracy of information. Translation of the initial information about the research into Khmer would also have been advisable, which would have saved time for individual organisations who undertook to do this themselves, and may have produced better information in advance of the two-week field visit.

No female interpreter was available when interviewing disabled women, which meant that some personal hygiene issues were difficult to ask and respond to through a male interpreter, which may have left gaps or inaccuracies in data.

1.5.2 *Generating solutions through discussion*

The main difficulty that arose in undertaking this process was the limited time available for investigation and discussion of what solutions could be developed. This was further exacerbated by the constraints imposed by the need for translation of all discussion.

2. Findings

2.1 Personal assistive devices and accessible facilities

Personal assistive devices (ADs) are pieces of equipment used by a disabled person, often designed or chosen specifically to meet their individual needs, which enable them to access and use water and sanitation facilities more easily or more independently.

Accessible facilities are those constructed with features – whether intentional or not – that make them possible, or more comfortable, or less arduous to use by a disabled or frail elderly person or their carer.

Adapted facilities are those with additions, changes or adaptations which are fixed to the structure in order to increase accessibility.

2.1.1 Drawing water

A range of accessible water sources was observed and reported, including hand-pumps, wells and rainwater storage facilities. See Appendix A8, Table A8.1, for complete data on drawing water.

Lessons learned:

Proximity

This was seen to be a major factor in accessibility of a water source, i.e. a water collection point in or near to the house or place of use (up to 20 metres). Proximity could be improved by constructing a well in the compound of the disabled person's home, a communal well located near their home, or by having a large storage jar which the disabled person could take water from themselves, which was filled either from rainwater harvesting or by the family.

A number of water sources were seen which were not adapted, but still proved beneficial for the disabled person because of their proximity. Benefits include:

- For some disabled people who were only able to move short distances, drawing water was now possible, whereas they previously relied on family to draw water for them.
- Reduced time and effort taken to get water, which frees up more time for other activities.
- Increased quantities of water can be drawn in less time, which creates new opportunities, e.g. income generating opportunities.
- Smaller quantities of water tend to be drawn each time, because the time taken is less, so water is more likely to be drawn as it is needed.

The need for storage is therefore reduced, and the potential difficulties in accessing stored water sources.

Benefits are felt not only by the disabled person, but by the whole family, and often neighbours too.

- Other family members who previously also spent a lot of time collecting water, now have time to spend on other activities, e.g. small children have time to play, or go to school.
- Neighbours use the water source, thus reducing their time spent collecting water.

An alternative way of reducing the distance between water source and place of use is to take the water-related activity to the water source. Bathing and washing clothes next to the water source, for example, reduce the quantity of water that needs transporting and storing.

Reachability / accessibility

The path to the water source needs to be in a condition which allows the disabled person to reach it easily. A smooth even approach path benefits not only wheelchair and crutch users, but also amputees, frail elderly people and children. It can be made of earth, bricks or concrete. Concrete is more durable, but high cost, while earth costs nothing, but may get washed away periodically and need regular maintenance. Locally available materials such as brick are cheaper than concrete, and when laid as a path can prevent it becoming muddy and slippery in the rainy season.

The width of the path will depend on who will use it. A crutch user needs 100cm minimum, this width is also useful for a person who needs support from a carer; a wheelchair user may manage with a narrower path, e.g. 80cm, depending on the width of the wheelbase. A person walking with a stick can manage with ~40cm.

If there needs to be a slope, this should be a smooth ramp, ideally a minimum 100cm wide¹, although at a household level, this may depend on the width of the wheelchair that will use it – a 75cm wide ramp was seen being used by a child with a child-sized wheelchair.

A concrete ramp should have a raised kerb (e.g. H: 6cm x W: 6cm) on each side where there is a drop, to prevent the wheelchair falling over the side.

Ramp gradient

For independent mobility, i.e. the user can push him or herself up the slope, the gradient should be a maximum of 1:12, although 1:15 is preferred for

¹ DAC draft Accessibility Guidelines (McCausland & Clark, 2000).

independent mobility.² If the ramp is long, it should have flat resting places at intervals, and a flat place to stand or stop the wheelchair next to the water source (See Figure 1 & Figure 2).

A second choice option for assisted mobility has a steeper gradient, maximum 1:8.³ This is for where space is limited, and 'pushers' are available to help propel the wheelchair up the ramp.

The gentler the gradient, the better it is for independent mobility, as it gives the user a choice of whether to seek help or not. The drawbacks are the higher cost of materials, and a long ramp that takes up more space than a short steep one.

Where space permits, especially in the case of communal facilities, a choice of both steps and ramp should be provided, especially where the ramp is steep or long, as people who tire easily may prefer to use steps.

For blind people there needs to be enough permanent structures such as gate posts, trees or other, on the way to the water source for the person to be able to find their way independently using their hands to feel their way.

Handrails are recommended along paths and ramps⁴, but none were seen on paths to water sources. (See also Section 2.1.8: Hand-rails).

At the water source the user needs to be able to reach the water drawing mechanism to be able to operate it, e.g. bucket and rope, or handpump handle.

Where the hand pump or well has a concrete platform or apron, access to the platform should be provided via a ramp, to allow a wheelchair or crutch user to get in the best position to reach the handle or lifting device. There should be a level area on the platform/surrounding ground to stand, sit or position a wheelchair next to the handle. Where possible the option should be provided of operating the handle with either left or right hand. Slipperiness should be minimised by using a slightly rough surface where the wheelchair/crutch user stands to prevent them slipping.

² DAC Accessibility Guidelines propose a maximum gradient of 1:12 (McCausland & Clark, 2000). The guidelines draw on UNESCAP's Design recommendations which propose a maximum 1:15 (UNESCAP 1995). Elsewhere, international guidelines propose an ideal 1:20, maximum 1:12 for independent mobility.

³ In its design specification for an accessible toilet, UNICEF Cambodia suggests a maximum ramp gradient of 15%, i.e. 1 in 7.5, which is too steep for independent mobility. In practice the gradient is reported to be more usually 1:10 – 1:13. (These are reported to be currently under review).

⁴ DAC draft Accessibility Guidelines.



Figure 1. Heng rests on flat area halfway up ramp to toilet.

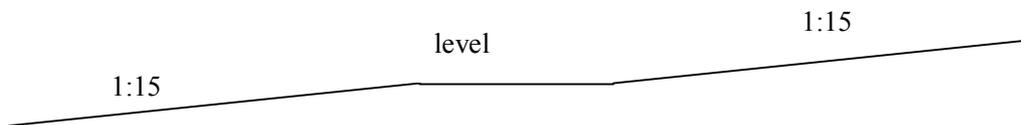


Figure 2. Gradient of ramp.



Figure 3. Hook and pulley arrangement that Mr Tu maintains himself.



Figure 4. Mr Ath Vuth demonstrates the fixed cantilever well that he designed and constructed himself.

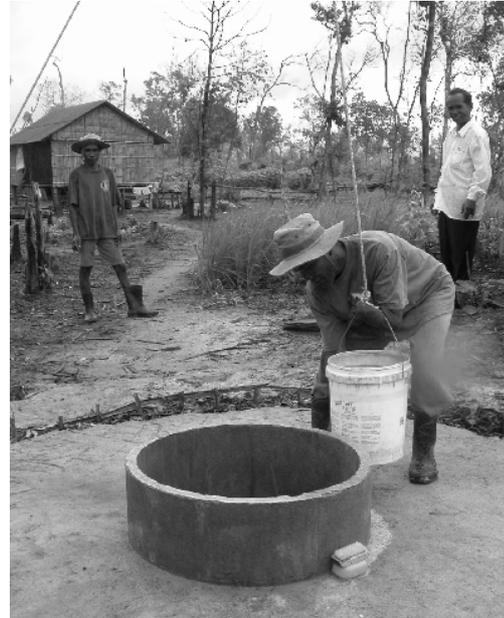


Figure 5. Ratchet and pawl mechanism, constructed out of wood by Mr Ath.

On a handpump apron, the drainage slope must be away from the area where the user stands or sits to operate the pump, to minimise water on the platform. A spout that is 90 degrees to the handle enables a wheelchair user to pump water whilst holding a container to be filled, although this would only be possible from one side of the pump. If the container is placed on the ground to be filled, it is still less distance to move from the pump handle to the container.

No wheelchair users were observed drawing water, so no dimensions for these areas are available.

Usability – how easy it is to use

If the well is open with no lifting mechanism, there should be somewhere safe for the user to stand or sit. A raised well wall (e.g. H: 82cm) is helpful for a person standing to lean on for balance while drawing water.

A flat cover over the raised wall, with an access hatch for lowering and lifting a water container, provides an additional surface to lean on, and to rest the container before and after filling. This avoids the need for the user to bend down.

Where people with a range of impairments will use the facility, the raised wall needs to be low enough for a wheelchair, or person sitting to use, or a child, i.e. not above waist or chair arm height, so that they can reach their arms over the side of the wall into the access hatch. The hatch must be at the edge of the cover so that it is within easy reach of all users.

The bucket may be lifted with a rope, or if the water level is high enough, with a bamboo pole with a hook on the end. A pole could be awkward to use for someone with limited arm movement, however, as it needs to be raised almost vertically in order to be lowered into the well. It can also slip if the bucket is heavy, as can a rope, and burn the hands of the user.

A lifting device benefits everyone, whether disabled or non-disabled, especially those with limited strength or poor grip, as it can prevent the rope burning hands or stumps of arms.

A pulley attached to a wooden frame over a shallow well can make lifting easier (Figure 3).

A cantilever arrangement with a pulley placed over the well through which a rope passes can be combined with a ratchet and pawl, which is used as a winding and locking mechanism for the rope (see Figure 4 & Figure 5). This is useful for a disabled person with only one arm, or a user with limited strength, as it gives additional control over the lifting process. It could also be of wider benefit to users of deep wells, whether disabled or non-disabled. The arrangement is an adaptation of a cantilever well which is apparently widespread in Cambodia. The ratchet and pawl can be made out of wood, which is cheap and locally available, but easily damaged, whilst metal is more expensive but more durable.

A 'Rabbit' treadle pump is easy to use by people with a range of impairments, as it can be operated using either hands or feet (see Figure 6, Figure 7 & Figure 23). The user pushes down alternately on the ends of two lengths of wood which are pivoted around a metal bar. The lengths of wood after pushing down then automatically return to their original upward position. The downward and upward movement moves two metal rods up and down in a pipe and opens and closes a set of valves. This opening and closing of valves allows water to be drawn up the pipe and out of the outlet.

However, it is only useful for water tables which are less than 7 metres below the surface.

Maintenance

Water source lifting devices which can be maintained by the user can lead to greater self-reliance, and the disabled person becoming a resource for the community, if they can then help others to maintain their devices.

Three types of lifting device were seen, that disabled owners have repaired themselves.

- 'Rabbit' treadle pump (Figure 6, Figure 7 & Figure 23): the spare parts could be purchased locally and the above ground structure parts could be designed and replaced by the user.
- Ratchet and pawl lifting and locking mechanism (see Figure 4 & Figure 5), designed and constructed by the owner
- Simple pulley arrangement on a frame (Figure 3): the pulley can be replaced with locally available parts.

Water containers

The size of container for lifting water can be adjusted to suit the strength of the user. Small containers, e.g. up to 5 litres, can be made out of used food cans or receptacles. Water can then be emptied into a larger container for transporting if required.

In this way, the weight of water and any risk of rope burn are reduced, which is of particular benefit to people with limited strength or poor grip, such as elderly people and children.

2.1.2 Transporting water

Disabled people were observed transporting water using locally available equipment. Only one device was seen specifically made for use by a disabled person (gripping hook), but this was not observed in use. See Table A8, Appendix A8.2, for complete data on devices for transporting water.

The need to transport water can be reduced by a) bringing the water source nearer to the user (see 2.1.1: proximity), and b) taking water-related tasks, e.g. bathing, washing clothes, to the water source.

Lessons learned

A carved wooden yoke allows more water to be carried at one time than if they just carried one bucket by the hand. This is a method widely used by the general population in S.E. Asia. The yoke is suitable for users who may have damaged arms or hands, or limited grip, but who can walk.

Many Cambodian houses are built on stilts with steep entrances via wooden ladders. Carrying a bucket of water upstairs to the house is possible for a person who cannot walk up the steps, e.g. who has only one leg, or weak legs. This can be done by sitting on one step at a time and pulling the bucket up to balance on each subsequent step. This task can be made easier if the ladder, rather than having round rungs, has steps, which provide a flat surface to rest the bucket on (Figure 8).

For a blind person, known fixed landmarks, e.g. trees, fence post, etc. are needed to enable them to find their way from the water source and the place of use carrying a bucket of water.

No wheelchair users were observed or reported transporting water.

2.1.3 Storing water and accessing stored water

The water storage facilities seen were mainly ferro-cement storage jars of varying sizes, generally 200-500 litre, which are common in Cambodia, filled via a rainwater harvesting system in the rainy season, and by hand from wells in the dry season. See Table A8, Appendix A8.4, for complete data on devices for storing water and accessing stored water.

Lessons learned

20-50 litre water jars are helpful when provided at points of use, e.g. inside the latrine, or next to the bathing area. This is common practice in SE Asia. Even if they need to be filled by other family members, they can enable disabled people to be more self-reliant, as they do not have to request and wait for water every time they need it. Family members can fill the container when it is convenient for them, rather than on demand.

Water can be drawn from these wide-mouthed jars by reaching into the jar from the top, using a bowl or scoop, which is accessible for most disabled persons with reasonable range of arm movement. For disabled people with limited arm movement, a tap fitted at the bottom of the container, and the jar raised off the ground, would make it easier to draw water. A rubber strap made of used tyre inner tube may be used to hold the container in place and prevent the risk of it being knocked over (Figure 9, right). Alternatively, the jar can be placed low down in relation to the user, e.g. on a slope below a path (Figure 10).



Figure 6. Mrs Nourn who is blind, operates treadle pump with her feet.



Figure 7. Mr Lann has an artificial leg, so operates pump with hands.



Figure 8. Steps to traditional Cambodian houses in rural area.



Figure 9. Gravity fed system: hose from large rainwater storage jar leads to small jar in bathing area.



Figure 10. Heng bathing from water jar placed at lower level than bathing platform.

Water can be made directly accessible by means of a gravity system fed from a rainwater tank (Figure 9). A flexible hose leads from the main storage container to the smaller secondary container. The hose has a tap on the end, which allows the water flow to be controlled by the user at the point of use.

2.1.4 Drinking

Only one example was seen of an AD to enable a disabled person to drink more independently. See Table A8, Appendix A8.5, for complete data on ADs for drinking.

Lessons learned

A supportive chair with an attached tray can enable children or adults with poor balance and/ or co-ordination to drink unaided (Figure 11).

A tray is best fixed firmly in place to reduce the risk of it being knocked over. A table or other alternative may be used instead of a tray, as long as it fits closely around the front of the user's body, to minimise any gap, which an object such as a cup could fall down.

2.1.5 Bathing

In Cambodia it is traditional to bathe by scooping water from a source, e.g. river, pond or well, or large container, using a household cup or bowl, and pouring it over the body. A number of bathing facilities were observed that enabled the bather to sit comfortably next to and use a water source in this way. The ADs seen were mainly different forms of seating, all locally made. See Appendix A8, Tables A8.6 and A8.7, for complete data on accessible facilities and ADs for bathing.

Lessons learned

Accessible bathing facilities had the following features in common:

Reachability / Accessibility

See Section 2.1.1.

Internal space

See Section 2.1.7 for more details on internal dimensions. Where the bathing area is enclosed, the entrance must be wide enough for a wheelchair or crutch user to enter: minimum width 75cm for a wheelchair, but this may vary. There must be enough space to turn in a wheelchair, or with crutches or a carer, e.g. 134cm x 100cm excluding water storage. Where a bathing seat is used, space should be provided so that a wheelchair can be positioned alongside the seat for ease of transfer.

The floor needs to be as even as possible to enable a wheelchair to stand firm while the user transfers to or from it, before and after bathing.

Privacy

It is traditional for both men and women to bathe in the open, using a *krama* or sarong for privacy. Some disabled people with movement or co-ordination problems may have difficulty manipulating a sarong to maintain their privacy in this way. Additional privacy while bathing is therefore needed, especially for women. A private bathing area can be created at low cost, using screens of locally available materials, such as leaves, rice sacks or polythene sheets.

Seating arrangements

These are needed for the bather to avoid sitting or lying on a wet or dirty floor in their own bathwater. Those seen were all moveable and designed specifically for the individual disabled user.

Bathing benches were made of wood or of a metal frame with a sitting / lying surface of woven rubber strips made of tyre inner tubes (Figure 9, right). Water must be allowed to drain easily away from the surface of the bench, so that the bather is not sitting in his or her own bathwater, and so that the surface of the bench dries out quickly, and does not deteriorate rapidly.

Rubber webbing has better drainage, is softer to sit on and therefore more comfortable for a person who may be liable to pressure sores from always sitting. Both rubber and wood are easy to clean and hygienic.

In terms of support, a wooden seat is firm and supportive. Rubber webbing is less supportive, and may be unsuitable for a person with poor sitting balance, who may need additional support from a raised back and/ or side arms or rails. It is useful to provide hand-rails on one or both sides of the bench for the person to hold onto for balance while moving onto/off the seat, and whilst bathing (Figure 12).

The height of a seat or bathing bench must be decided in consultation with the user as far as possible, as it needs to be of an appropriate height to transfer easily from and to a wheelchair, or for a crutch/stick user to sit down or get up from.

If there is enough room, the seat should be made wide enough to provide room beside the user to put objects used for bathing – water container, soap, clothes, etc.

Water source: Positioning a seat or bathing bench right next to a water source can allow the bather to bathe with less assistance (Figure 9, right, & Figure 12). See Section 2.1.3 for water storage options.

A rail is useful for hanging clothes to prevent them getting wet.

Assistive devices for bathing

The footrest of a wheelchair can be used as a seat whilst bathing (Figure 10), which has several advantages:

- A separate bathing seat is not needed, which reduces the space needed for bathing.
- The seat of the wheelchair does not get wet, as it would if the bather stayed sitting in the wheelchair to bathe.

- It may be easier to reach the water source from a lower position.
- It is suitable for a user with strong arms and good sitting balance.
- It is suitable for a wheelchair with small single/pair of wheels at the front, e.g. Mekong model.

However, it is not suitable for all circumstances:

- If the user is heavy and the design of the chair makes it liable to tip up.
- For users with weak arms and poor sitting balance.

For a person with only one arm, this arm may be washed by splashing water over it using the same arm and then by rubbing it up against a fixed rough object. Many surfaces could be used, such as a post or tree, which are widely available at no cost in the rural area. However these surfaces may also be too rough, dirty and cause soreness.

A prosthetic arm attachment was seen in the form of a bowl or scoop for pouring water over the body when bathing (Figure 13). However no-one was interviewed who had experience of using it. A single arm amputee is unlikely to need it, as they could use their one hand to hold a scoop to bathe. Particularly as prosthetic devices tend to be removed for bathing and it is a relatively high cost option. There are other functions for which it could be useful, such as bathing one's children. A double amputee would need assistance in attaching it, but could then bathe independently.

2.1.6 Washing clothes, dishes and doing household chores

Facilities were observed for use in washing clothes and dishes. No special methods or ADs for house-cleaning were observed or reported. See Appendix A8, Table A8.8 for complete data on washing clothes and dishes.

Lessons learned

Washing clothes

Clothes washing is often carried out immediately after bathing and next to the same water source. It is therefore helpful if bathing arrangements, such as benches, can be designed for multiple use, i.e. not only for bathing, but also for washing clothes, dishes, etc. This can be done by providing enough space on the seat next to the user for objects such as washing bowl, clothes, soap, etc.

Containers used for washing may be commercially available plastic washing up bowls, or 20 litre jerry cans with the top cut off, which are cheaper.

Washing dishes

A pot draining rack can be made at low or no cost out of split bamboo attached to a frame. This can be constructed at a height suitable for the user.

2.1.7 Waste water and refuse disposal:

See Appendix A8, Table A8.9 for complete data on waste water and refuse disposal.

Two similar approaches being used by disabled people who can walk and their families:

Refuse and wastewater are poured into a hole in the ground. When the hole is full, a tree can be planted on it.

Refuse is collected in one place and burnt. The ash is used as a fertiliser.

Both these methods are a good use of resources, are relatively hygienic and cost nothing. For a person who can't walk, the location of the hole or refuse pile would need to be accessible, and for a blind person, well marked.

2.1.8 Toilets

Toilet facilities seen were all in rural areas, all in the homes of disabled people. Four accessible toilets and four ADs used in toileting were observed. Photos and diagrams were seen of several others. This is fewer than in either of the other two countries where fieldwork has been carried out, which may partly be a reflection of the low priority given to sanitation in rural areas of Cambodia. See Appendix A8, Tables A8.10 and A8.11 for complete data.

Lessons learned:

Reachability and accessibility

See Section 2.1.1. In addition:

A flat area/ platform in front of the door or entrance is recommended, so that wheelchair users are not in danger of rolling backwards, or crutch users find it easy to balance whilst opening the door or curtain. Where a door opens outwards, the flat area should be a wheelchair width deeper than the width of the door, to allow a wheelchair to manoeuvre around the open door. For example, if the door is 88cm wide, and the wheelchair 60cm wide, the flat area needs to be $88 + 60 = 148\text{cm}$ deep (Figure 14).

Handrails: For a child or adult with poor balance or co-ordination, e.g. cerebral palsy, some form of support along the approach path is helpful, such as horizontal single or parallel bars to enable the person to walk independently from the house to the toilet. This can also have the additional therapeutic function of helping to keep the child or adult's legs strong through regular exercise.



Figure 11. Tuan drinks, sitting in specially designed supportive chair with tray (HI/CABDIC).

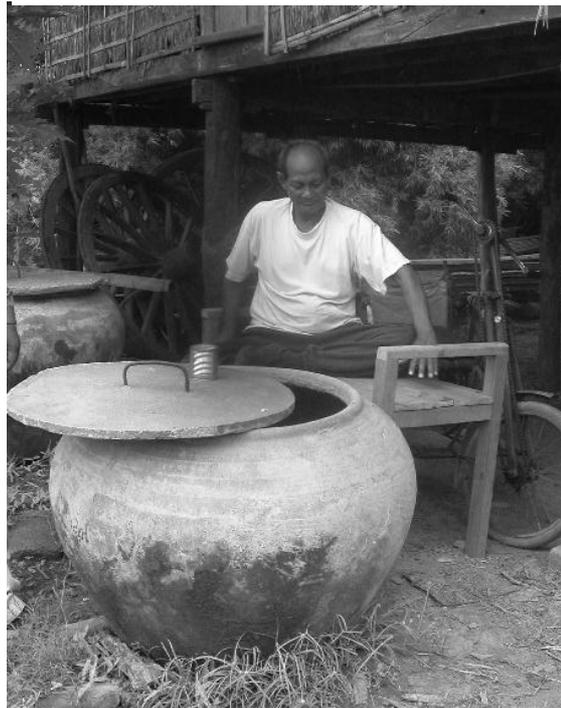


Figure 12. Mr Kong transfers from wheelchair to bathing bench beside water jar (SCI Centre, Battambang).



Figure 13. Prosthetic forearm with interchangeable attachments, including bowl/scoop for use in bathing (ICRC design, produced at Siem Reap PRC).





Figure 14. Heng manoeuvres wheelchair to open toilet door.



Figure 15. Hook for running string through to shut toilet door (HI/CABDIC).



Figure 16. Adjustable handrail made of iron pipe (HI/CABDIC).



Figure 17. Wooden handrail beside toilet extends from door to back wall (HI/CABDIC).

The disadvantage may be that if the distance to the toilet is far, it is time-consuming for a carer to supervise the disabled person getting there, and can add to rather than reduce his/her work-load.

Latrine doors

The entrance should be wide enough for a wheelchair to easily enter, e.g. W: 80-95cm, although at a household level this depends on the width of the wheelchair in question. For most crutch users, extra entrance width is convenient, although not essential.

An outward opening door, or a hanging curtain, allow unobstructed space for the user to manoeuvre inside. However, an outward opening door can be more difficult to close from the inside. This can be solved by:

- making the door self-closing.
- attaching a string or rope to the door, which passes through a hook on the door frame overhead, which the user pulls on from inside, and ties – e.g. to a hand-rail – to fasten the door (Figure 15).

Where lack of space makes it difficult to close the door (see section below on internal dimensions), a curtain of sacking or plastic sheeting can provide privacy without restricting outstretched legs, e.g. because of stiff joints, or an artificial leg. This is a widely used low-cost option, which does not need closing and does not restrict space inside. However, it is not an ideal solution especially where facilities are communal, as it is not as secure as a door. For many disabled people, especially women, privacy and security are a high priority, and lack of either can cause anxiety about latrine use, which can lead to urine retention, and subsequently to health problems.

Internal dimensions and layout

A disabled person usually needs more space inside the toilet than a non-disabled person, but how much can vary. A range of internal dimensions was seen that provided a continuum of uses, as outlined below. Where a number of disabled people with a range of needs use a facility, the preferred option is to provide more space, rather than less. (In the following examples the door opens outwards, unless otherwise stated).

1. The most spacious examples had extra room in front of the toilet for a wheelchair to enter and turn.
E.g. overall dimensions: 200 x 150cm (including toilet seat + built-in water trough). Space for wheelchair to turn: 100cm x 150cm.
2. Enough room between the door and toilet for a wheelchair to enter and close the door behind. The user may need to reverse either in or out.
E.g. overall dimensions: 150 x 176cm (including toilet + built-in water trough).. Distance between door and front of toilet: 90cm.

3. Enough room for a wheelchair user to reverse in, to position the chair over the toilet hole, and to close door.

E.g. overall dimensions: 140cm x 100cm (including water storage jar beside toilet).

4. Enough room between entrance (with a hanging curtain) and toilet seat for a person who walks with a stick to sit in privacy.

Distance between curtain and front of toilet: 30cm.

Floor: The floor should be even, for ease of use by wheelchair or crutch users or people with poor balance or co-ordination. It should be smooth for easy cleaning, but not so smooth as to make it slippery when wet.

Internal support structures

The most common need is to provide support for a person unable to squat independently. Two approaches to support were seen:

- a) hand-rails for balance while sitting or squatting, and to help lowering onto the toilet and getting up, and/or
- b) b) some form of seat for sitting on while urinating or defecating. Some of these were an integral part of the latrine structure, others were ADs which were removable.

Handrails

Handrails are invaluable to hold onto for balance and support while sitting or squatting, and to help a disabled user when lowering onto and getting up from the toilet, or when transferring to/from a wheelchair.

Rails may be of galvanised iron pipe, bamboo or wood. Bamboo and wood are widely and often freely available, but are less durable than iron pipe. If they are made of steel or iron pipe, the height can also be made adjustable. This is especially useful in the case of a child user, as the rails can be raised as the child grows (Figure 16).

Rails were seen in different locations:

- Two horizontal rails of 30mm iron pipe, cemented to the floor on either side of a squat toilet. Height: adjustable; distance apart: 72cm, L: 82cm. For use by a child with weak legs who has difficulty squatting.
- Single horizontal wooden rail beside the squat toilet, extending from the door to the back wall, H: 50cm, for use by a child who walks unsteadily and has difficulty squatting (Figure 17).
- Two wooden rails, one on either side of toilet seat, H: 18cm above the height of the seat. For use by adult when getting on and off the seat, and for balance whilst sitting (Figure 9, right, Figure 12).

Iron rails should be painted to resist corrosion, particularly in a pit latrine, where fumes can contribute to corrosion.

At a household level, the location and dimensions of rails should be chosen to suit the needs of individual users.

Drawbacks: For many wheelchair users, the easiest way to transfer from wheelchair to toilet is sideways, by positioning the chair beside the toilet. Where possible, therefore, care should be taken to avoid fixing a rail at the side of the latrine which may obstruct this.

Toilet seats

A raised toilet seat is suitable for users unable to squat, or with poor balance. It is also convenient for transfer from/to wheelchair, and for crutch users who may have difficulty lowering themselves into a squatting position, and even more difficulty standing up again! The user also avoids the risk of their clothes getting soiled and wet.

Drawbacks: A seat may be uncomfortable for people who are used to squatting, or may be perceived as 'Western' and culturally less acceptable. A seat also makes anal cleaning using water more difficult.

Seats can be fixed or moveable.

Fixed seats: may be of cement or wood. (A design was seen for toilets with built in seats, probably of brick and cement, but these were not observed first hand).

A latrine seat in the form of a wooden box (L: 70cm x W: 54cm) with a square hole in the top (W: ~10cm x L: ~40cm), and two handrails, one on each side of the seat, can be placed over a small latrine pit and dug into the ground slightly for stability (Figure 18).

In this way the seat is treated as a fixed latrine, and the area around the box can be screened for privacy, but the seat can still be moved to a new location when needed, e.g. when the pit is full, or during flooding in the rainy season.

Both wood and cement are best painted, to make them urine repellent, more durable, easier to clean and more hygienic.

Moveable toilet seats: these have a hole in the seat, and are designed to be placed over the toilet pan, so that urine and faeces drop directly into the hole. They may be moved to one side when not in use.

Wheelchair as a toilet seat: This was the only moveable toilet seat seen. To avoid the need to transfer on and off the wheelchair, the chair may be designed or adapted so that it can also be used as a toilet seat. The

wheelchair is positioned directly over the toilet pan, the seat cushion and a central plank of the seat are removed by the user, revealing a ~10cm wide gap in the seat (Figure 19). Faeces and urine fall directly into the hole.

To ensure that the wheelchair is correctly located over the toilet hole, cement (or other material) mouldings can be made for the wheels to slot into (Figure 20).

Advantages: The disabled person can use the same toilet facilities as the rest of the family. There is no need to leave a seat in the toilet that may obstruct other users, and no extra space is needed to accommodate a wheelchair as well as the toilet.

Drawbacks:

- This is not suitable for all designs of wheelchair. If the frame underneath is not designed in such a way that the central section is kept clear, then the frame can easily become fouled, and wet from anal cleaning.⁵
- This approach can only be used where the toilet pan is set flush with the floor, otherwise the wheelchair cannot be wheeled over it.
- The latrine floor needs to be strong enough to withstand the weight of the wheelchair.
- Anal cleaning using water is more difficult when using a seat than when squatting. However, a long gap in the seat from front to back makes this easier.

Squat latrine: For a disabled person able to squat, but with poor balance, a handrail is often sufficient to make a squat toilet usable (see the section on had-rails above).

Commode seats: Where reaching or using the latrine is a problem, for whatever reason, a commode seat may be the alternative. This is a toilet seat, as described above, but used with a container underneath it, e.g. bucket, bowl, or can. The contents are then disposed of in the toilet or elsewhere. No commodes were seen that were currently being used.

Wooden box seat as commode: The wooden toilet seat described previously could be used as a commode seat, by leaving it free-standing instead of dug into the ground, and by placing a container beneath it. (This was described as an intention by one informant, who had not yet tried it out. The following conclusions have been drawn by researchers).

⁵ The Mekong wheelchair as seen in the photographs is not designed for use as a toilet chair. However the child had only just received this new chair the day before our visit, and the family could not yet comment on this aspect of its use.



Figure 18. Wooden toilet seat installed over latrine pit (SCI Centre, Battambang).



Figure 19. Heng's wheelchair with removable centre panel in seat to create a toilet seat.



Figure 20. Cement mouldings provide correct wheelchair positioning (CABDIC/HI).

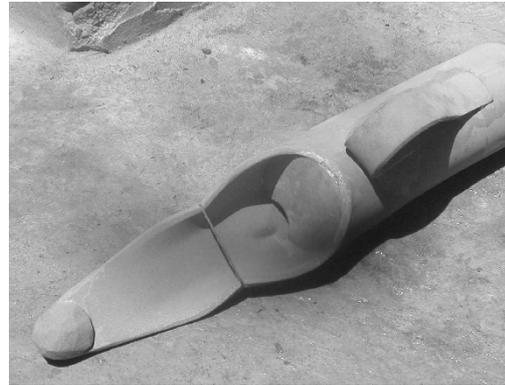


Figure 21. Anal cleaning device of soft plastic (Kampong Thom PRC)

Advantages: The position of the commode can be changed depending on circumstances, e.g. rainy/dry season, changing needs of the user, etc. It can be located as near to or even inside the house as required, which would not be possible or desirable in the case of a pit latrine. There is no need to dig a pit.

Drawbacks:

- The container needs to be emptied and cleaned by another family member each time it is used.
- The sides of the box are solid, so the carer needs to lift it each time to remove the container to empty it. But the seat is heavy to move, which

makes this inconvenient. However, it would not be difficult to adapt the seat, so that a container could be removed and replaced more easily, either from above, by changing the shape of the hole, or from the side, by making one side removable.

- There is a long drop from the seat to the container, with the risk of fouling inside the box and the floor inside. A shelf or struts could be installed to hold the container higher up.

Internal water source

For water storage options, see Section 2.1.3.

For personal hygiene: Water is particularly important for anal cleaning for a number of groups, including women when menstruating (whether disabled or non-disabled), people who use catheters, or use manual bowel evacuation. An internal water source is therefore considered highly desirable. This is commonly a water storage jar (see Section 2.1.3), or a water trough of tiled or cement-covered brick, which is constructed as part of the facility.

For toilet flushing: Several toilets seen were pour-flush toilets. Some disabled people may have difficulty fetching water, and may need to rely on others to do this for them (see Section 2.1.3).

The volume of water needed can be reduced if a pit latrine is used, which does not need to be flushed with water. Leaves and other anal cleaning materials can also be thrown into it after use. The main drawback is the bad smell. This can be reduced by sprinkling ash into the pit to cover faeces, and by covering the toilet hole with a lid when not in use (Figure 18).

Assistive toilet devices

A soft plastic washing device can be useful to clean the anus after defecation (See Figure 21). This is cylindrical in shape, with a handle, and a small opening so that it holds water and releases it very slowly, whilst the elongated soft 'finger' is used to wash the anus. This can be designed and made locally.

It could be useful in extending the reach of people with limited movement or flexibility, e.g. unable to turn and reach far enough to wash themselves. It is also likely to be welcomed by carers and the disabled people they care for, for whom it would make carrying out personal hygiene tasks for another person pleasanter for the carer, and more dignified for the disabled person.

Other

For a child, the toilet and the access way to it may be painted in bright colours to make it attractive (Figure 17). This would be beneficial for all young children, many of whom avoid using toilets as they are often dark, smelly scary places.

Painting also makes wood and concrete more waterproof, durable, easy to clean and hygienic.

2.2 Approaches to improving access to water and sanitation for disabled people

Organisations providing data on approaches to improving access for disabled people to WATSAN include those from the disability sector and those from the mainstream WATSAN sector. A couple of organisations have experience in both sectors. (NB: most of the organisations referred to as 'WATSAN sector' have broader remits than just WATSAN).

Lessons learned:

Different types of organisation are using a range of approaches to support disabled people in accessing WATSAN. A range of examples of good practice were seen or reported.

Nothing found by the research was highly technical. Often very simple solutions make a big difference in enabling disabled people to access WATSAN.

2.2.1 Approaches focusing on provision of assistive devices/ accessible WATSAN facilities to individual disabled people and their families

Researchers visited a range of organisations which work specifically with disabled people and their families, and saw a variety of approaches being used. For some agencies, water and sanitation – mostly sanitation, have been an integral part of their work, others have addressed it as the need arises, often by liaising with other agencies with a specific WATSAN focus, while for others it has not been a focus of their work to date. Nevertheless, the different approaches provide useful lessons that can be applied to WATSAN service delivery. See Appendix A8, Table A8.12 for complete data.

Examples of approaches include:

- Disabled individuals designing, constructing and paying for a family well according to their specific needs.
- Local DPO or elderly association identifying the need for a facility, asking for assistance from a mainstream provider through their DPO or association network.
- Social/rehabilitation/outreach workers providing individually tailored technical advice, ADs and accessible facilities to disabled people.

- Referral to WATSAN providers by social workers/OTs based on assessment of needs of disabled person and family.

Lessons learned:

1. Disabled people are not a homogeneous group, so one size does not fit all. People with different impairments often have different access requirements.
2. Disabled people themselves are often in the best position to understand their own needs, priorities and most appropriate solutions, and may only need support in terms of a conducive/supportive environment. This was observed to be particularly the case among disabled men with impairments acquired as adults, such as amputations from land-mine injuries.
3. However, not all disabled people and their families are always aware of what solutions are possible, may lack the skills to implement concrete solutions, and find it difficult to communicate their requirements to the technical sector. The role of an external agency is therefore important in providing information about available options in easily understood formats, e.g. drawings or examples of equipment, and in discussing their advantages and disadvantages with the family, so that they can make an informed decision.
4. Effective needs assessment takes a holistic approach, and considers not only physical, but educational, economic and social needs. Assessment may be carried out by personnel from a range of backgrounds, including OT, orthotic/prosthetic specialist, social worker, or by members of self-help groups such as DPOs or Associations of the elderly.
5. The most effective solutions have resulted from a process of building a relationship and working with the disabled person and their family in their home environment. The focus is on identifying the family's priority needs, offering advice and support, or referral. Solutions may include skills development, special equipment, adaptations or referral to other relevant services, and encouragement to family and neighbours to support the disabled person.
6. Disability agencies are focusing on support at a household level for disabled individuals, who do not benefit from the standard designs and communal facilities currently being implemented by WATSAN providers. Some of these people have highly individual needs, but many more could, with some extra thought and flexibility, be catered for by mainstream WATSAN provision.

7. Solutions identified by disability sector agencies may involve drawing on locally available community resources, including referral to external agencies, e.g. a WATSAN service provider working in the local area.
8. When equipment is provided, some form of contribution on the part of the family, however small, is likely to lead to better use and maintenance of solutions on their part. This may take the form of a financial, material or labour contribution to a facility or equipment.

Work with disabled people may usefully take place in different settings:

Institution-based rehabilitation: takes place in a centre, such as a hospital or clinic, providing treatment, assessment and rehabilitation. Specialists, who may include physiotherapist, occupational therapist (OT), prosthetic/ orthotic technician, and social worker provide advice to disabled people on how to manage as independently as possible with daily living activities, including personal hygiene, and other activities using water.

There are usually opportunities to try out ADs and adaptations, e.g. wheelchairs, toilet seats, bathing benches, etc. with support from specialists, to identify those most suitable for the disabled person's own needs.

Community-based outreach/rehabilitation: Outreach workers, e.g. social workers or OTs, who may be based in institutions, visit disabled people at home, to support their rehabilitation and development in the family and community setting. (This may be as a prelude or follow up to institution-based rehabilitation).

Outreach workers provide ongoing support and monitor progress, so that solutions can be adjusted according to the disabled person's changing requirements. This is particularly crucial for children as they grow and develop, and for those recovering after newly acquired impairments.

Support has a stronger chance of being appropriate and sustainable when provided in the family and community context.

Disabled people's organisations: are initiated and run by and for disabled people for their own self-development, who are developing extensive networks of local disabled peoples' self-help groups at village and commune level. DPOs appear to be focusing primarily on mobilisation and confidence building to help disabled people solve their own problems. They are highly motivated to find and implement solutions according to their own priorities, and have requested assistance from WATSAN agencies in the past.

A role which at least one group envisages for itself is in promoting examples of accessible facilities to the wider public, e.g. by developing models accessible WATSAN facilities at a communal location. DPOs could also play a valuable role in disseminating good practice concerning appropriate designs for WATSAN among disabled members. With their grassroots membership, and

understanding of the needs of members, they also have the potential to provide information to the WATSAN sector in the future.

Constraints

There is limited information about possible options in improving access to WATSAN for disabled people. Good practice that does exist tends not to be well documented or shared effectively between organisations.

Communication and collaboration between the disability and the WATSAN sector have been limited. The disability sector appears not to have raised the issue of access to water and sanitation with the WATSAN sector in a consistent way. There is a lack of awareness of some working in the disability sector of the benefits to be gained by improved communication.

Agencies providing ADs/adaptations have limited funds, so beyond the basics, further materials and facilities at household level need to be funded by the disabled person's family. For poor families, this clearly restricts the level of provision that disabled people are able to access.

Institution based services where specialist staff do not visit the disabled person's home, their advice may be based on an incomplete understanding of the actual home environment. Facilities in an institution cannot reflect all possible home circumstances.

Outreach is time-consuming and labour intensive. The number of disabled people who can be supported in this way is limited by the number of outreach workers available.

DPOs do not automatically represent all disabled people. They tend to be dominated by educated men with mild physical and visual impairments, whilst the needs of less articulate groups, such as women, children, and frail elderly people, may be under-represented. People with certain impairments are often stigmatised even by other disabled people, such as people affected by leprosy, those with spinal cord injuries, with learning difficulties, and deaf people.

A DPO may be an unsuitable forum for discussion of basic personal needs, as most groups have both female and male members. Opportunities may need to be created for single sex groups to discuss personal issues, such as hygiene and sanitation.

DPOs are not yet present in all Districts of the country.

Recommendations to improve effectiveness

The disability sector, including DPOs, MOSALVY, and service providers need to document and share their approaches and experience.

Improved communication is needed with the WATSAN sector, e.g. to provide advice on how they could better incorporate the views of disabled people.

Technical staff could be involved in piloting and trialling different designs of ADs or adaptations.

2.2.2 Approaches to the inclusion of disability issues within mainstream WATSAN service provision

Agencies contributing data on issues of WATSAN implementation included local government departments, international donors, local and international NGOs working in WATSAN service provision and in the disability sector. Information was provided mainly through discussions. No visits were made with WATSAN organisations to observe their work (see Section 1.5.1 on limitations of data collection). See Appendix A8, Table A8.13, for complete data.

Approaches to implementation include:

- Government, international organisations, NGOs with external funding supporting the project process – usually community-based for water supply, sanitation at household level or communal for schools.
- Development organisation using local branches and volunteers to identify the most vulnerable people in emergency situations and then to follow up with WATSAN and other responses.
- Private sector supporting most other providers with supplies of well rings, pulleys, and other materials. Now also involved in community piped water supply systems in partnership with government and an NGO.

Lessons learned:

Several mainstream WATSAN providers are identifying and prioritising support to the 'most vulnerable' within their projects, which specifically includes disabled people. Communal wells have been installed near to or in the compound of a disabled person, thus improving their access through proximity. For some agencies this has been prioritised before implementation of other planned facilities.

Several agencies have provided wheelchair accessible communal latrines in school or emergency settings. For schools, toilets with disabled access are generally only provided when a specific request is made.

A design for accessible communal sanitation facilities is available and shared between organisations.

A few WATSAN providers are using a range of methodologies to identify the most vulnerable, including disabled and elderly people, pregnant women, etc, and to respond to their needs. Most commonly, the aim is to identify the most vulnerable individuals and households within a given community, with provision then based on assessed needs.

The knowledge and experience of local people is used – of local government staff, local agency staff members, VDCs and community volunteers, to carry out surveys to identify the most vulnerable in the community, supported by training, supervision and monitoring/checking by national level staff.

The majority of WATSAN service providers have not considered disabled people. This appears to be due to lack of awareness rather than deliberate exclusion, and the assumption that standard provision covers all, and that there is no need because of a lack of expressed demand.

There is a lack of information on available options for accessibility.

Constraints

Assessments to determine the most vulnerable take time and need the adequate staff resources.

Communal water sources may not benefit disabled people, who often live in isolated locations far from the wells.

Recommendations to improve effectiveness

Information is needed for the WATSAN sector, including:

- Technical designs, pictures, photographs illustrating the options available to improve access to WATSAN for disabled people.
- Questions/issues to consider in initial surveys, consultations, to ensure needs of disabled people are considered.
- Guidelines on implementation, e.g. ways to modify commonly used approaches such as initial project surveys, participatory consultations, evaluations, etc. to ensure disabled people are included and consulted.

A range of opportunities could be used for sharing good practice:

- Accessible WATSAN facilities constructed in public buildings would provide practical models for practitioners and the public to learn from.
- Widely used standard designs to include designs for accessible facilities.
- Use existing sector working groups, sector seminars and informal networking opportunities for information sharing.
- Build on the existing knowledge and experience of organisations in prioritising the most vulnerable, by encouraging them to share their experiences, and then develop the ideas further.

2.3 Policy/strategy issues for accessible WATSAN services

Discussions were held with informants from agencies involved in issues of WATSAN and disability policy and strategy, including local government departments, international donors, local and international NGOs working in WATSAN policy and strategy development, and in the disability sector. See Appendix A8, Table A8.14 for complete data on policy and strategy issues.

Lessons learned:

1. The new National Policy for Water Supply and Sanitation specifies in various sections that the poorest and most vulnerable will be ensured access to services, in both urban and rural and in water supply and in the sections on sanitation. There is no strategy for implementation of the policy as yet.
2. Within the National Policy there is a move towards projects becoming more demand led. Specific procedures will be needed to ensure the needs of the most vulnerable, including disabled people, are sought, as they are least likely to express a demand. Requirements for participation and equity in the national policy can assist in this area.
3. There is a move towards a greater use of the private sector, which is profit / market focused, for whom any additional project costs incurred in WATSAN delivery by adaptations/accessible design would reduce profit, as the limited and poorer market is too small to be profitable. The government therefore has an important regulatory role, in ensuring that contracts between government and private sector providers contain requirements to address social / equity issues in service delivery.
4. One WATSAN implementer with a strategy that specifies disabled children as a target groups, does implement accessibility in practice,

indicating that a clear strategy on inclusion helps lead to inclusion in practice.

5. Disability legislation currently in draft form, aims to promote improvements in all areas of disabled people's lives, including rehabilitation, health, education and labour issues, and issues of access and self-representation. MOSALVY has taken the lead in developing the legislation, and will also have lead responsibility for implementation, often in collaboration with another ministry from the relevant sector, e.g. education.
6. Not all staff of other Ministries are aware of the development of disability legislation. There are omissions in several crucial areas, such as public access, improved living conditions, etc. where no other ministry is specified as responsible for implementation, or water and sanitation facilities are not mentioned.

Constraints

The current low levels of demand, provision and use of rural sanitation (9%), and low coverage of safe water supply (24%) in Cambodia make the task of the WATSAN sector a daunting one.

There is a lack of available information concerning good practice in WATSAN provision for disabled people.

The perception exists among some in the WATSAN sector that WATSAN for disabled people is an issue for disability specialists, requiring special technology, rather than a concern for all planners and service providers.

Donors are moving away from sectoral support and towards areas such as governance, leaving less funds available specifically for WATSAN.

Some donors would be prepared to support initiatives relating to disability, if the area of work is in line with their own priorities.

Recommendations

A strategy for implementation of the National Water Supply and Sanitation Policy needs to be developed, with specific inclusion of disabled people among vulnerable target groups in general objectives, and articulating the responsibilities of WATSAN planners and implementers to include disabled people. Implementation in this area needs to be monitored by the Government.

Draft disability legislation needs to specifically include access to water and sanitation, e.g. in the following areas:

- Improvement of living conditions ‘including food, clothes and places’.
- Issues of public access are described, but communal water facilities not mentioned and no responsible ministry specified.
- Under education, the requirement of ‘reasonable accommodation’ makes no mention of accessible toilets.

The relevant WATSAN ministries should be consulted on ways to remedy these omissions and improve the draft legislation. A framework will then need to be developed by each relevant sector to identify the steps to be taken to ensure that implementation is put in place.

Communication and collaboration between the WATSAN sector and disability sector need to be strengthened. For example, WATSAN organisations need advice on how to work with disabled people, including how to take account of the views of disabled people.

Lessons could be learned from approaches to mainstreaming gender in the WATSAN sector, including the need for multi-faceted approaches and strategies.

The government should include clauses within its private sector contracts to ensure that the poorest and most vulnerable are served with appropriate WATSAN.

Given appropriate incentives, NGOs or engineering companies could develop and promote specific designs for disabled people. If the adaptations recommended were simple, the private sector would be more likely to take them up.

A range of key organisations would need to take on the issue of disability in their work and programmes, in order to promote widespread inclusion of disability issues in WATSAN provision, including:

- Government ministries responsible for disability issues, and those responsible for planning and provision of water and sanitation;
- Donors, some of which are also implementers;
- Consultants and architects who design large scale or national projects;
- Respected and powerful figures with the power to make other people think about the issue and to keep the issue on the agenda, e.g. key Ministers

- The Seila decentralisation programme, which has a WATSAN component, also has a gender mainstreaming section / group, through which disability issues could be added.
- Large national and regional programmes, e.g. The North-western Rural Development Programme, and forthcoming small town programmes.

2.4 Fieldtesting materials

2.4.1 Content

Lessons learned

Interest: Photos aroused interest and discussion, because of the human interest. No comments were made by local respondents on images of different cultures, i.e. S Asia and Africa, and this did not appear to get in the way of conveying ideas about solutions.

Clarity of message: There were different opinions as to how clear to understand photos were. Some respondents thought they were easy to understand, but on further questioning, they had understood a completely different message from the one intended to be conveyed. Once explained, drawings appeared to provide clearer information than photos.

Usefulness: technical drawings and diagrams, in order to be able to communicate with technical implementers to put into practice.

Other: Some of the facilities are high-cost, and could be off-putting to some people, especially if those are the first images seen. This would indicate that it would be better to present low-cost options at the beginning, with more sophisticated solutions coming after.

Different types of images are valuable different reasons – initial human interest, conveying accurate information about the use of a solution, technical information for constructors, implementers.

Some of the images conveyed ideas without explanation, others stimulated ideas in respondents that were unintended, but surprising. This indicates that accompanying text will be useful, but not necessarily central to being able to understand or gain benefit from the materials.

This indicates that a combination of all three types of image with accompanying text will best meet the needs of all target audiences.

2.4.2 *Process of field-testing*

Lessons learned

- Accurate translation of questions asked is important for determining the value of materials. The words and terms should be discussed and agreed with the interpreter beforehand.
- Effective selection of questions is needed to get opinions on material style versus particular content of photos.
- Homogenous groups are needed for discussion, e.g. disabled women in groups separate from men.

Drawings need to be reduced to the same size as the photos to have accurate comparison of effectiveness.

3. General Conclusions

These conclusions are based on a two-week field visit, and are limited by the way the data was collected (see Section 1.5). The conclusions are therefore not intended to be applicable to Cambodia as a whole.

Accessible facilities, adaptations and assistive devices to improve access and use of water and sanitation, were seen to have benefited most of the disabled people and families visited, in terms of one or both of the following:

- Increased self-reliance and ability to contribute to the family or community, improved social status and self-esteem of disabled people;
- Reduced work-load, improved well-being, economic situation, self-esteem and status of the family.

This indicates that inclusion of disability in WATSAN clearly has potential to make a valuable contribution to poverty reduction strategies.

A range of options were observed and documented, in terms of technologies, methodologies, materials, cost, etc. The majority of solutions were low- or no-cost, using locally available materials and designs. None of the solutions or approaches seen were highly technical.

More data was found in the area of water provision than sanitation, and a greater range of designs for water abstraction devices seen than in previous research visits. This may be a reflection of the low rate of sanitation coverage, and the wide range of water collection technologies in use in Cambodia. The advantage for the research was that this data contributed to remedying some of the gaps in data on water collection.

The majority of WATSAN service providers had not addressed the issue of access for disabled people. Reasons given for this included:

- They had not previously thought about it.
- A perception that this was an area for disability specialists, and required specialised technology.
- A lack of demand for accessible facilities.
- It was not a priority issue, given the challenges of service provision in Cambodia.

Similar issues to these have been raised by WATSAN sector informants in previous fieldwork. Increased awareness and information about appropriate solutions could go a long way to addressing these issues.

Those agencies that were involved in delivering accessible WATSAN facilities were from a range of backgrounds, including WATSAN providers, disability organisations, and individuals at household level. A wide range of providers therefore need to consider ways to make facilities more accessible for disabled people.

Several WATSAN agencies had policies and/or strategies that specifically included disabled people as one of a number of vulnerable groups prioritised for services. These agencies were much more likely to be implementing accessible facilities than those that did not.

The most common way of implementing the strategy in practice was by:

- identifying disabled and other vulnerable people and their needs, during community-level needs assessment,
- locating wells near to the homes of disabled people, and
- including wheelchair accessible latrines in communal latrine blocks.

Providing more accessible facilities does not have to cost anything – simply by locating a facility near a disabled person’s home can significantly improve access for many.

This is not an appropriate option for all disabled people, some of whom are unlikely to benefit from increased proximity, including those with severe mobility impairments, and those living far from the centre of a community. It is a solution for those currently disabled, but does not address the potential needs of those who may become disabled in the future.

Individuals and groups of disabled people had designed and constructed a range of facilities (mainly water) suited to their own needs, demonstrating that they have experience and capabilities. Providers could draw on that experience, by ensuring the participation of disabled people in the WATSAN design and delivery process, so as to make sure that services are as accessible as possible to the disabled people who will use them.

Information about examples of good practice was not widely available in Cambodia. The good practice that existed tended to be initiated by individuals, or in small-scale projects, and was not well documented or shared in ways that others could learn from and replicate.

Many disabled people are disproportionately disadvantaged by current low levels of household sanitation, as they cannot use traditional methods independently, i.e. indiscriminate defecation in the forest. Disability sector agencies have therefore been involved in providing accessible sanitation, usually at household level, through provision of ADs and accessible sanitation facilities designed to meet the needs of individuals. This indicates that the

need for household sanitation for disabled people does exist, even though there may be no demand because of a lack of awareness on the part of disabled people and their families as to possible options.

Disability sector service providers were found to be using a number of different service delivery approaches, usually community-based, or a combination of institution-based/ outreach, but all based on responding to needs identified in a household assessment, in consultation with the disabled person and their family. The approaches are holistic and effective, but labour-intensive. They are therefore inappropriate in their current form for use by large-scale WATSAN service-providers. However:

- Some WATSAN providers are already using a community-level needs assessment as part of their service delivery process, which is labour-intensive, and demanding of staff time.
- There may be aspects of the household assessment that could be used to improve the current practice of community-level assessment.
- Alternatively, WATSAN providers could consider collaborating with social/ community workers when dealing with disabled people with more severe impairments or complex needs.

Communication and collaboration between the WATSAN and disability sectors was found to be happening at a community level, largely on an ad hoc basis, but with positive results in terms of disabled people gaining access to WATSAN facilities. At an institutional level however, there was an apparent lack of communication between the sectors, and lack of awareness of the need for any. This is likely to have adversely affected policies and planning of each sector, resulting in a number of apparent limitations and omissions.

Accessible design is good design, which is good for all people, including disabled people. There is a mistaken perception that disabled people all need separate 'special' facilities. In fact, with a little extra consideration and flexibility, the majority of disabled people could benefit from mainstream services. A number of features that make it easier for disabled people to use a facility could be incorporated at little or no extra cost into standard designs for communal facilities, such as water points. For example: alternatives to steps, water-lifting devices suitable for people with less strength, ways to avoid a slippery surface, handrails for support. All of these are features of good design, which would benefit other marginalized and disadvantaged groups in the community, especially frail elderly, children, pregnant women and the chronically sick.

Lessons learned

There is a need for information aimed at both the disability and WATSAN sectors, firstly to raise awareness of why it is important to include disability issues in WATSAN, and secondly to improve practical implementation.

Emphasis needs to be placed on the close links between disability and poverty, the economic and other benefits of accessible facilities on the whole family, the low-cost, added value of incorporating access from the outset of planning, and technical problem-solving aspects of accessible design.

Universal access needs to be emphasised, rather than 'special' facilities, and the benefits it brings to other marginalized groups in the wider community, e.g. frail elderly, pregnant women, children, etc. This could promote the idea among implementers that, instead of disability seen as yet another minority issue, ways to address the needs of disabled people could also help address the needs of other marginalised and underserved groups.

Practical information needs to include:

- Technical designs, pictures, photographs illustrating the options available to improve access to WATSAN for disabled people.
- Guidelines on implementation, e.g. ways to modify commonly used approaches such as participatory consultations, questions/issues to consider in initial project surveys, evaluations, etc. to ensure disabled people are consulted and their needs considered.

In addition to the above information, disabled people and their families need case studies illustrating the benefits of accessible options.

The current knowledge gap on issues of accessibility needs to be addressed, which could be done in several ways:

- Existing information – designs, booklets, case studies, etc. need to be more widely available;
- Organisations currently involved in good practice – especially those prioritising the most vulnerable, should be encouraged to document and share their knowledge and experience. This should happen both within each sectors, but also between the disability and WATSAN sectors. e.g. sharing experience in the process of needs assessment.
- Accessible WATSAN facilities could be constructed in public buildings, to provide practical models for practitioners and the public to learn from.
- Widely used standard designs could include designs for accessible facilities.

- A range of existing opportunities could be used for sharing this kind of information and good practice, including sector working groups, sector seminars and informal networking opportunities.

At an institutional level, WATSAN sector agencies and donors need to revisit their own policies, strategies and practices, with a view to:

- Specifically including disabled people in policy and strategy among the target populations for services.
- Examining their current methodology and practice of service implementation to ensure that they listen to and consider the voices and opinions of disabled, elderly and other marginalised groups in the community.
- Where disabled people are included as one of a number of vulnerable groups, these groups should be specified, and the generic term 'vulnerable groups' used sparingly. Efforts need to address each group in its own right, to avoid the risk of disabled and elderly people again becoming marginalised among the range of vulnerable groups.

Opportunities for communication and collaboration between the disability and WATSAN sectors need to be explored, to improve the sharing of their respective knowledge and experiences. Examples could include:

- Small collaborative pilot projects, or action research projects, to help improve current practice, to contribute to learning on the issue, and to enable the two sectors to learn from each other, and develop better understanding of their different roles in addressing the issue.
- DPOs and disability sector organisations could be invited to participate in the development of strategy to implement the National Policy on Water Supply and Sanitation, to help identify practical ways to include disabled people. For example, clauses in government/ private sector contracts to ensure the poorest and most vulnerable are served with appropriate WATSAN.
- WATSAN sector agencies could be invited to comment on draft disability legislation, with a view to remedying significant omissions related to WATSAN, and to discuss a framework for implementation.

References

British Embassy (2003) **DFID Small Grants Scheme Information**: project report outline, and funding format document.

Capacity Building of People with Disability in the Community (CABDIC): **Children follow-up book**. (Khmer/English) Handicap International Belgium: Cambodia.

McCausland, K & Clark, H (2000) **Accessibility Guidelines**. Draft document. DAC: Phnom Penh.

Danish Ministry of Foreign Affairs (2001) **Environment, Peace and Stability Facility: Natural Resource and Environment (NRE) Programme**. Cambodia Programme Document (2001 – 2005).

Department of Planning, Siem Reap Province (2003) **Siem Reap Province Base Map**.

Department of Planning, Siem Reap Province (2003) **Socio-Economic Profile, Siem Reap Province, 2003**. leaflet.

DevGroup International Development Consulting (2003) Organisational brochure. Devgroup: Canada.

DFID (2000) **Cambodia Country Strategy Paper 2000–2002**. UK Department for International Development.

DFID (2000) **Disability, Poverty and Development**. Issues Paper. Department for International Development: UK.

DFID, **Information on the Civil Society Challenge Fund in Cambodia**.

DAC (2003) **Statutes of the Disability Action Council (DAC)**. Disability Action Council: Phnom Penh. www.dac.org.kh/legislation/index/htm

Handicap International Belgium. **Booklet on household adaptations for daily living**. PRC, Siem Reap: Cambodia (drawings and text in Khmer)

International Development Enterprises. Posters and leaflets on the rabbit hand pump, treadle pump, treadle and pressure pump and rabbit water purifier. IDE Cambodia.

Jones, H and Reed, R (2003a) **Water supply and sanitation access and use by physically disabled people: report of field-work in Uganda**. DFID & Water Engineering and Development Centre: Loughborough University, UK.

Jones, H and Reed, R (2003b) **Water supply and sanitation access and use by physically disabled people: report of field-work in Bangladesh**. DFID & Water Engineering and Development Centre: Loughborough University, UK.

Kenefick, E (2000) **UNICEF Follow up Survey of Households in CASD Villages, May-June 2000**. UNICEF Cambodia in collaboration with the Royal Government of Cambodia, Ministry of Planning.

Kingdom of Cambodia (2003) **National Policy on Water Supply & Sanitation**. Prepared by the Coordinating Committee for Development of Water Supply and Sanitation Sector: Cambodia. (*unofficial translation*)

Larsen, KL (ed) **From charity towards inclusion: The way forward for disability support through Danish NGOs**. Study commissioned by Ministry of Foreign Affairs, DANIDA, in co-operation with Danish Council of Organisations of Disabled People.

Ministry of Rural Development, Seila Programme (2003) **Seila Technical Manual: template designs for local infrastructure projects**. (CD format).

Ministry of Rural Development (2003) Coverage and target data for rural water supply and sanitation.

Ministry of Rural Development, GRET, KŌSAN Engineering, French Ministry of Foreign Affairs, SEDIF, Aquadev **MIREP: The first steps of Private-Public Partnership in the Water Sector in Rural Cambodia**.

Partners for Development Cambodia. Organisational brochure.

Royal Government of Cambodia (2003) **Draft Law on Rights of People with Disabilities**. (*unofficial translation by Cheng Kim Phalkun, JICA/ MOSALVY*).

Royal Government of Cambodia/UNICEF (2001) **Investing in Children**. Master Plan of Operations of the Royal Government of Cambodia/ UNICEF Country Programme of Cooperation. 2001 - 2005.

SIDA (1999) **Sida's Development Cooperation for Children and Adults with Disabilities**. Swedish International Development Cooperation Agency, Department for Democracy and Social Development: Stockholm, Sweden.

UNESCAP (1995) **Promotion of Non-handicapping Physical Environments for Disabled Persons: Guidelines**. United Nations: New York. [ST/ESCAP/1492]

www.unescap.org/decade/publications/z15009ql/z1500901.htm

UNICEF/Handicap International (1999) **Activities and equipment to help a disabled child develop and learn**. Illustrated booklet. HI Cambodia.

WSP E Asia & the Pacific (2002) **Learning what works for Sanitation: Revisiting Sanitation Successes in Cambodia**. Water and Sanitation Program, East Asia and the Pacific: Jakarta, Indonesia.