

Behaviour change determinants, the key to successful WASH strategies

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The A.B.C.D. approach (Approach focused on Behaviour Change Determinants) is an anthropology-based approach developed by SOLIDARITES INTERNATIONAL. It is used to develop WASH operational strategies aiming at an optimal and sustainable impact on the reduction of water-borne diseases. It involves studying WASH behaviours along with the socio-cultural and economic determinants of these behaviours. As an example, we present the results of a study carried out in June 2014 in a peri-urban neighbourhood of Kinshasa in the Democratic Republic of Congo to illustrate how the A.B.C.D. approach helped shape the operational strategy of a project.

Introduction

Many organisations who are active in the WASH sector in humanitarian and development contexts are currently questioning the effectiveness of the assistance provided, with respect to the objective of reducing water-borne diseases¹. WASH operations are often designed and evaluated in quantitative terms (e.g. number of water points and latrines installed). These results mask a very different reality in the field where many installations are seldom used or used improperly and are often not sustainable. The impact of WASH operations on the reduction of water-borne diseases is not very well known and there are probably many examples of operations which have worsened pre-existing situations².

Installing or repairing infrastructure may not have the expected effects if the geographic, cultural and social realities of the targeted communities are not correctly taken into account³. Indeed, though the installation of infrastructure should make the environment more conducive to appropriate WASH behaviours, it does not guarantee changes in behaviour in itself⁴. This is where raising awareness about hygiene comes in, which is now recognized as a major part of WASH operations⁵. However, awareness-raising activities are rarely integrated into operational strategies which focus primarily on technical choices and the installation of infrastructure. In addition, one-size-fits-all methodologies are repeated without taking the trouble to contextualize them. What is more, the great majority of awareness-rai-

sing activities are based on health messages focused on the dangers of “bad” behaviours rather than on the expected benefits of appropriate behaviours⁶; it is assumed that once the population has been warned of the risk of contamination and the danger of water-borne diseases, they will adopt the thousand and one practices that are encouraged during these awareness-raising sessions. Here again, field realities are very different. The “good” practices which are promoted are restrictive and sometimes imply a major change in family habits. What is more, family habits are subject to a whole range of constraints and influences which are specific to their environment. This can sometimes facilitate changes in behaviour, but more often acts as a barrier to change.

The A.B.C.D. approach was developed in the light of the limits mentioned above. It is based on the work of the London School of Hygiene and Tropical Medicine⁷ and the Swiss Federal Institute of Aquatic Science and Technology⁸ as well as the socio-anthropological aspects of different WASH project methodologies (e.g. FOAM, CLTS, participatory approaches and social marketing⁹). A.B.C.D. attempts to bring these different sources together in an operational and pragmatic perspective. Its aim is to help develop operational strategies for WASH projects and to reinforce the coherence between infrastructure building, awareness-raising and community mobilization activities. These

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strategies are based on the analysis of both WASH-related behaviours in the targeted community, and the determinants behind these behaviours. To date, the approach has been tested in four different contexts: two semi-permanent IDP camps in the Central African

Republic, peri-urban communities in the Democratic Republic of Congo and rural communities in Bangladesh and Myanmar.

In this article, we will first discuss the main principles of the A.B.C.D. approach, and then to illustrate the approach, we will present some of the results of the study carried out by SOLIDARITES INTERNATIONAL in a peri-urban neighbourhood of Kinshasa.

A.B.C.D.: 1- Establishing a hierarchy of at-risk behaviours and practices

As part of the A.B.C.D. approach, based on the available scientific knowledge¹⁰ and the experience of SOLIDARITES INTERNATIONAL, five key behaviours have been retained as having the most impact on diarrhoeal diseases¹¹ : 1- Washing hands with soap at key moments of the day, 2- Adopting appropriate defecation practices, 3- Keeping latrines and house surroundings free of excrement, 4- Using potable water for drinking and cooking, 5- Collecting, transporting, storing and drinking water in an appropriate manner. Scientific research has established that the risks of diarrhoeal diseases are reduced by 47% if communities have appropriate hand-washing practices. Sanitation programmes can reduce the risk of diarrhoea by up to 36% and operations aiming to improve the quantity and quality of water can reduce the risk of diarrhoea by 20% and 16% respectively. Though other behaviours can have an influence on the risk of diarrhoea (food hygiene, the management of organic waste, household hygiene...), the principle of the A.B.C.D. approach is to focus the available resources on the 5 above-mentioned behaviours as, in the majority of contexts, they will have the greatest impact on cases of diarrhoea.

An initial assessment phase establishes to what extent these behaviours are adopted (e.g. the percentage of the population who get their drinking and cooking water from potable water points). The initial assessment also analyses people's practices in relation to these behaviours, and particularly practices which could increase the risk of contamination. With regard to hand washing, for example, the assessment establishes whether hands are washed before meals or after going to the toilet, and also the way in which hands are washed: a common at-risk practice in communities in the north of the Central African Republic is to wash hands in a basin of water which is used collectively. Adults first dip their hands directly in the water, without soap, followed by all the other family members in order, from the oldest to the youngest. The last in line are children under 5 years of age, who are the most vulnerable to diarrhoeal diseases and the most exposed by this practice of collective hand-washing. Identifying this at-risk practice helps establish that although it is important to encourage hand-washing with soap, it is just as important to tackle this practice of collective hand-washing.

Once practices have been identified and the occurrence of behaviours has been established, the assessment aims to understand if there is a correlation between at-risk behaviours / practices and the frequency of cases of diarrhoea amongst children under the age of 5. For example, we find out whether there is a significant difference in the number of cases of diarrhoea between families who have drinking water storage containers that are closed in their houses ("doers") and families whose containers are not closed

("non-doers"¹²). The occurrence of behaviours, the qualitative analysis of practices and the established correlation between behaviours/practices and the number of cases of diarrhoea then make it possible to establish what behaviours and practices potentially have the most impact on diarrhoeal diseases. The operational strategy will thus focus on these behaviours and practices as a priority.

A.B.C.D.: 2- Identifying the determinants of behaviours

Next, the A.B.C.D. approach aims to understand the positive and negative determinants of the prioritised behaviours and practices. For example, understanding what motivates families to have hygienic latrines and what may prevent other families from maintaining them properly. There are two distinct groups of determinants: external factors linked to the environment and factors which are internal to the operational strategy target groups (generally mothers).

Environmental determinants include, in an initial circle, all the aspects linked to the family: decision-making power, management of the family budget, authority, the respective responsibilities of different family members, the distribution of WASH tasks, childcare, etc. A second circle includes aspects from the community, village or neighbourhood environment: accessibility to water points, health centres, communication channels, demographics, ethnic and religious factors, opinion-makers, livelihoods, accessibility to markets, etc. The final circle includes regional and national environmental aspects: public policies in terms of Health, Education, WASH, Security, exposure to natural disasters, cultural systems, etc.



Internal determinants are the result of the psychological and physical characteristics of individuals. We try to establish which of these help or hinder individuals in terms of adopting appropriate behaviours. These positive or negative motivations can be economic, religious, based on security, prestige, privacy, disgust, comfort, maternal love, seduction, etc. The A.B.C.D. approach also aims to identify to what extent individuals know the causes of diarrhoeal

diseases and how they perceive the severity of these diseases for their young children and the consequences of diarrhoea on the rest of the family. However, the approach is based on the principle that though knowledge of the disease and its severity can favour the adoption of appropriate practices, it is not in itself sufficient to encourage a change in behaviour, due to the greater influence of the other above-mentioned motivators and barriers¹³. The A.B.C.D. approach also explores the extent to which individuals feel capable of regularly repeating behaviours (perceived capacity) and the influence of their relatives, friends and neighbours (injunctive norm). The approach can also look at physical determinants, such as questions of accessibility and physical effort related to WASH practices.

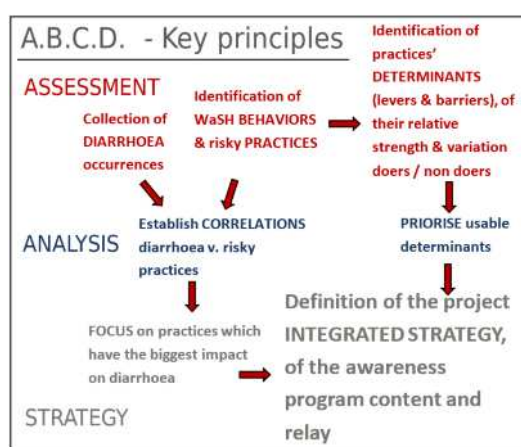
Finally, the assessment tries to identify the most significant determinants with respect to the prioritised practices and behaviours and evaluates the extent to which these determinants exist amongst doers and non-doers. If we establish that there is in fact no significant difference between the two groups for a given determinant, it is presumed that acting on this determinant will have little impact on the behaviour of non-doers¹⁴. For example, if it appears that families who maintain their latrines in a hygienic manner and those who do not all have an accurate idea of the seriousness and the causes of diarrhoea (here, faeces), it is possible to conclude that classic awareness-raising focused on health will probably have little impact on encouraging non-doer families to keep their latrines in a better state. On the other hand, if we observe that the prestige of having clean latrines is mentioned much more by the doers¹⁵, we deduce that prestige can be one of the focuses of awareness-raising content in order to incite the non-doers to adopt appropriate latrine cleaning practices.

A.B.C.D.: 3- Developing the operational strategy

The operational strategy will be based on the behaviours and practices which can potentially have the most impact on reducing the occurrence of diarrhoea amongst children under 5 years of age. **Analysis of environmental determinants** essentially allows barriers linked to the context where people live to be identified (e.g. availability of water, difficulties with communication channels, inter-community tension, insecurity, livelihoods which do not cover basic needs) and to base technical decisions and operations on these.

For example, if there are tensions between different communities (castes) in a displaced persons' camp in India, installing a single water point in the area occupied by one of the castes will mean that it will be under-used by the other caste. Understanding these social tensions and other environmental determinants will make it possible to

choose appropriate sites and technical solutions (in this case, by installing a water point for each community). Analysis of the environment will also make it possible to identify the people who have the most influence over the targeted group, both inside families and in the community. For example, conducting awareness-raising activities with mothers who do not have much authority or freedom of expression within their husbands' families (generally the case in India, Bangladesh or in the north of the Central African Republic) would be useless if the husband's family prevents the mother from adopting appropriate practices. In cases like this, awareness campaigns should target both mothers and mothers-in-law (in reality, women between 18 and 45 years old). Detailed understanding of the social environment will allow opinion leaders, potential awareness-raising relays and the most pertinent community mobilization strategies to be identified.



Analysis of internal determinants can have an impact on the choice of technical options. For example, taste is often an essential determinant in the choice of water points for drinking. Thus, installing a pump which draws water from a ferruginous aquifer can lead to the water point being under-used and even abandoned even though the water is potable. Other technical solutions should be given priority (treatment of surface water or reaching aquifers with neutral tasting water). Analysis of internal determinants is also essential to produce awareness-raising and community mobilization messages – c.f. the example of prestige given above as a way of encouraging the maintenance of toilets.

Batumona – methodology of the survey

The survey was carried out in Batumona, a peri-urban neighbourhood of Kinshasa of about 30 500 inhabitants (3 800 families) which is currently going through huge demographic growth. It was funded as part of the Potable Water Supply Pilot Project (*Projet Pilote pour l'Approvisionnement en Eau Potable*), funded by the French Development Agency, which has installed water networks in 14 neighbourhoods of Kinshasa and the surrounding

areas. The Batumona network was put into operation at the beginning of 2014 and covers the densely-populated zones of Batumona. The most recently occupied area, however, is not well supplied. Its inhabitants are more dispersed, communication channels are either badly damaged or non-existent and plots subject to erosion during the rainy season.

Studies were carried out over a month by a team of fourteen people, eight men and six women, with varied profiles (hygiene, public health, social issues, urbanism, events, marketing, etc.) all of whom were from the neighbourhoods targeted by the project in order to encourage understanding of the environment and ownership of the activities. The team received training in the A.B.C.D. approach and the main principles of WASH activities in parallel to their work on the studies. Three people facilitated the process and analysed the results.

The choice and succession of initial assessment activities was aimed to limit reporting biases and to assess families' day-to-day realities in as realistic a way as possible. Before beginning the studies, two members of the facilitating team spent three days living with two families in the two neighbourhoods targeted by the project (immersion). An observation visit, two studies on gender and a mapping of Batumona were also carried out in advance in order to improve understanding of the neighbourhood environment and the socio-cultural context in which the inhabitants live. Several studies were then conducted by the teams in the families and at the different types of water point. The studies were conducted with more than 220 families with children under 5 years of age, or around 9% of the targeted population¹⁶, spread throughout the neighbourhood. The studies were based on a methodology of structured observation complemented by closed questions. The team members were also encouraged to discuss freely the reasons for the observed practices (whether appropriate or at-risk) and note any supplementary and relevant information which was not included in the questionnaire. Each study was discussed in advance with the team. On average they lasted two or three days. A debriefing session on determinants and at-risk practices was organized after the first day and at the end of each study. Lastly, a final study was carried out to check the occurrence of the determinants which had been identified, as well as the variations between doers and non-doers.

Batumona – understanding and frequency of diarrhoea

The prevalence of diarrhoea among children under 5 during the two weeks before the study in Batumona was 31% (95% confidence interval: 25.1% - 36.9%), compared to an average of 14.1% in Kinshasa¹⁷. A focus on families in the five most at-risk streets of Batumona showed that the incidence of diarrhoea was higher, at an average of 48%¹⁸.

Diarrhoea is perceived as one of the most serious "diseases" for children under 5 years of age. 86% of the mothers who were asked considered that diarrhoea was a big problem for their child and 58% spontaneously spoke of the possibility of children dying as a consequence of diarrhoea. What is more, the mothers spoke of the major source of stress that diarrhoea represents for the family: mothers are "paralysed", unable to leave their child and unable to work. Families have to spend considerable amounts, equivalent to at least one day's work, to treat the child¹⁹. The mothers therefore worry about the repercussions on the other children of the family who they will not be able to feed due to a lack of money. The first cause of diarrhoea that mothers mentioned spontaneously was food, but half also mentioned water as another cause. Only 16% of mothers spontaneously mentioned contact with or ingestion of excrement, but they all replied that this caused diarrhoea when they were directly asked. Thus, the mothers generally had good understanding of the causes of diarrhoea and especially were very conscious of the seriousness of the disease for their children, and indirectly, for the rest of the family.

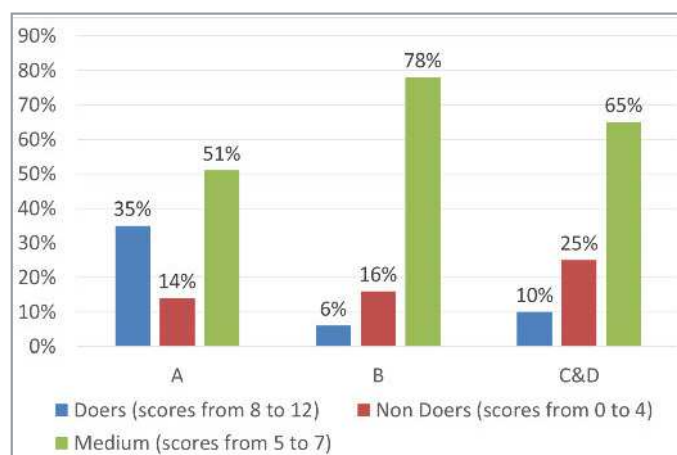


Figure 1 – Distribution of families in sub-neighbourhoods A, B, C and D based on their hygiene practices

Knowledge of the causes of diarrhoea did not prevent a large number of families from having inappropriate hygiene practices. The study established a clear correlation between the environment of the neighbourhood and hygiene practices: Batumona is divided into four sub-neighbourhoods called A, B, C and D by the local administration. In sub-neighbourhood A (more densely populated, well served by potable water points and easily accessible), 35% of the respondents were doers (families with appropriate hygiene practices, measured by a score of between 8 and 12 out of 12) and 14% were non-doers (families with at-risk hygiene practices, who had a score of between 0 and 4 out of 12).

In contrast, in sub-neighbourhoods C and D (poor potable water coverage, difficult communications and a high level of erosion), 10% of respondents were doers and 25 were non-doers (see graphic above).

The study established a significant correlation between practices and diarrhoea with regard to **the cleanliness of latrines, the consumption of rain water as drinking water (collected in a non-hygienic manner) and the hygiene of the drinking water storage container**. It should be noted that the study did not establish a clear correlation between hand washing with soap, and children’s diarrhoea. However, this behaviour was selected as one of the priorities of the operational strategy. Indeed, the analysis of hand washing was based only on what the mothers said (being unable to observe what happened) and this is often biased as they are ashamed to admit that they do not wash hands at key moments of the day. The reference for the study was therefore the meta-analyses carried out on the subject [see above].

We will now focus on the consumption of rainwater collected in un-hygienic conditions to illustrate how the A.B.C.D. approach is applied to an at-risk practice²⁰.

Batumona – the consumption of rainwater for drinking and cooking

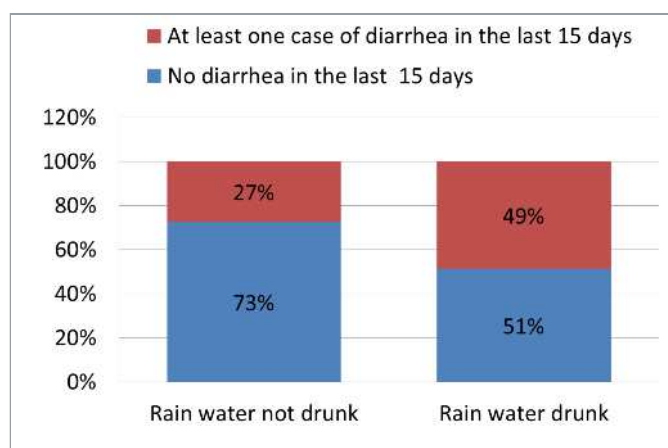


Figure 2 - Occurrence of diarrhea and consumption of rainwater for drinking

97% of the families in Batumona collect rainwater from the roofs of their houses using buckets and containers which are used for various purposes. 90% of these families use the water as drinking water and/or for cooking. However, 78% of families think that rainwater can lead to disease. Amoebas were mentioned by 63% of the respondents, and typhoid fever and diarrhoea respectively by 33% and 27% of the respondents. There is a significant correlation between the occurrence of diarrhoea amongst children under the age of 5 and drinking rainwater (see graphic above). Though rainwater is potable in itself, the roofs and containers which are used to collect it can be full of pathogens (particularly after a long period without rain)²¹.

The rainwater collection systems in Batumona vary from household to household, the roofs are not cleaned, the

containers are often dirty and 42% of families collect water as soon as it starts raining; these factors certainly explain why this correlation exists.

The main reasons given for using rainwater for drinking that were mentioned during our study were: 1- because of its coolness (pleasure – 22%), followed by 2- it is free (economic – 21%), and 3- it is easy to collect (accessibility -20%). The other reasons were mentioned in fewer than 15% of cases 4- its taste in addition to its coolness (pleasure – 13%), 5- habit (11%) and 6- because it comes from God (belief – 9%). The divine nature of rainwater, though not spontaneously mentioned very often in this study, was often spoken of with the teams: “God gives us rainwater, it is pure and we must use it”. Amongst all the determinants mentioned above, a significant difference exists between doers and non-doers on the subject of it being **free** (mentioned by 50% of non-doers vs. 16% of doers), its **accessibility** (47% of non-doers vs. 14% of doers), **habit** (29% of non-doers vs. 5% of doers) and **belief** that it comes from God (11% of non-doers vs. 0% of doers).

The main reasons given for not drinking rainwater were: 1- to avoid diseases (fear of **diseases** – mentioned by 37% of respondents), 2- because of the particles in the rainwater (**disgust** – 28%), 3- the poor quality of the water (perception of **quality** – 14%), 4- because of the smell (**disgust/smell** – 12%). The size of the response related to preventing disease remained relatively small, if we take into consideration that the majority of the population thinks that rainwater can cause disease. The determinant of disgust (presence of particles) was mentioned relatively often. The only significant difference between doers and non-doers concerns the determinant of smell mentioned by 17% of doers compared to only 3% of non-doers.

Batumona – operational recommendations regarding the consumption of rainwater

The main awareness-raising message is to dissuade the use of rainwater as drinking water for children under the age of 5²², considering that there are safe water points in the neighbourhood and that many families already give their very young children « improved » water (for example in bottles). Awareness-raising also has to tackle the problem of roof and container hygiene.

Health-orientated awareness-raising will not have a great deal of effect as the vast majority of respondents are already conscious of the problem. However, reinforcing concern about amoebas with that of diarrhoea could provide a small amount of leverage. Accessibility is a major determinant for rainwater consumption. The issue of access can only be tackled by **improving coverage by potable water points**, notably in sub-neighbourhoods C and D. However, improving access will not completely resolve the problem of rainwater consumption for children under

five. Indeed, the inhabitants of sub-neighbourhoods A and B consume it despite having easily accessible potable water points close to their plots. It is therefore essential to engage in awareness-raising in the other areas which have been identified.

The motivations which are the easiest to exploit (due to their frequency and the difference between the doers and the non-doers) are economics and disgust. An area to work on would be the perceived cost of illnesses. For example, the cost of treating illnesses like amoebas and diarrhoea could be compared to the money saved by collecting rainwater. Disgust would also be a way of getting families to take notice. As a general rule, the inhabitants of Batumona wash their hands before eating essentially to get rid of the “dirt” stuck to their hands. It would be possible to compare the rainwater collected in a non-hygienic way to the water in the basin which is used to wash hands, and exploit this disgust by showing that drinking the rainwater is like drinking the water from the basin where everyone washes their hands. Disgust could also be exploited by, for example, asking someone to wipe the roof with their finger, then asking them to lick their finger (which they will refuse to do), then comparing this with the rainwater collected from a dirty roof. In terms of the perceived purity of rainwater because “it comes from God”, it is possible to get round this belief by focusing on the dirty roof: though the water is pure, the roof is covered in “dirt” (as is the container if it is not washed) and pathogens which pollute the water that is collected. Finally, though it is difficult to exploit aspects related to the taste and coolness of water, they nevertheless show that awareness-raising which promotes water treatment methods (such as boiling and chlorination) would not have a great deal of impact due to the change in taste caused by the treatment (the taste of boiled water is affected by the pot that is used and the people do not like chlorine at all)²³. These treatment methods will nevertheless be recommended for drinking water for children under 5 years of age.

Conclusion

The example of rainwater consumption in Batumona shows how important it is to understand the factors which determine behaviour: the study established that health is not an area which can be exploited to encourage the adoption of appropriate practices in terms of collecting and consuming rain water. On the other hand, targeting accessibility, household economics and disgust will have a significant impact in terms of changing behaviour. A monitoring phase of several months will nevertheless be necessary to ensure that the new behaviours become firmly established. In order to do this, key messages have to be repeated and families need to be provided with support in order to help them overcome any difficulties they might have to face in connection with changing their behaviour.

The A.B.C.D. approach is based on the targeted communities’ environment and day-to-day lives. On the one hand, it encourages observation and critical analysis on the part of the local team in charge of collecting information, and on the other hand, it forces us to think about the context of the project in order to develop integrated and made-to-measure operational strategies. The A.B.C.D. approach aims to be adaptable rather than a fixed project methodology. Though its main principles are relevant in any context (training and mobilization of teams, focus on at-risk behaviours, analysis of practices, of external and internal determinants, of integrated strategies, support and monitoring of practices), it is flexible and can be adapted depending on the environment, the resources of the project and the level of progress of the activities. The A.B.C.D. approach requires about a month and implies investing the resources needed to carry out the study and developing the operational strategy with the team. However, the principles of the approach are easy to test and can be adapted to each organisation’s own tools and methodologies and can be adopted by any Project Manager who wants to establish the conditions for the sustainable adoption of appropriate behaviours. The aim is also to develop a simplified version of the approach which will be relevant for acute emergency contexts. At the time of writing this article, SOLIDARITES INTERNATIONAL and EAWAG are in the process of testing this area.

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¹ Hunter P. Waterborne diseases and water safety. in CRASH/Fondation - Médecins Sans Frontières. Is humanitarian water safe to drink? October 2011

² Analysis: Sanitizing the Truth - When WASH Fails. IRIN Africa English Service. Al Bawaba (Middle East) Ltd. 2013. HighBeam Research. 30 Jun. 2014 <<http://www.highbeam.com>>

³ Mara D, Lane J, Scott B, Trouba D. Sanitation and health. PLoS Med. 2010

⁴ Cairncross S, Shordt K. It does last! Some findings from a multi-country study of hygiene sustainability. Waterlines. 2004

⁵ Peal et al, Hygiene and Sanitation Software, An Overview of Approaches. Water Supply & Sanitation Collaborative Council, Geneva, Switzerland, 2010

⁶ - Peal et al, Hygiene and Sanitation Software, An Overview of Approaches. Water Supply & Sanitation Collaborative Council, Geneva, Switzerland, 2010 - Dreibelbis Robert et al., « The Integrated Behavioural Model for Water, Sanitation, and Hygiene: a systematic review of behavioural models and a framework for designing and evaluating behaviour change interventions in infrastructure-restricted settings », BMC Public Health, 13 (1), Dec 2013, pp. 1 13.

⁷ Aunger R, Curtis V. The Evo - Eco Approach to Behaviour Change. Applied Evolutionary Anthropology. Springer Verlag. In press.

⁸ Mosler HJ. A systematic approach to behavior change, interventions for the water and sanitation sector in developing countries: a conceptual model, a review, and a guideline, International Journal of Environmental Health Research, 2012

⁹ Peal et al, Hygiene and Sanitation Software, An Overview of Approaches. Water Supply & Sanitation Collaborative Council, Geneva, Switzerland, 2010

¹⁰ - Curtis V. Talking Dirty: How to save a million lives. International Journal of Environmental Health Research . 2003 Jun;13 Suppl 1:S73-9.

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¹¹ This article will focus on diarrhoeal diseases. However, the main principles of the approach are relevant for determining strategies in relation to any disease or malnutrition.

¹² In the article, “doers” refers to families with appropriate practices and “non-doers” to families with at-risk practices.

¹³ Aunger R, Curtis V. *The Evo - Eco Approach to Behaviour Change*. Applied Evolutionary Anthropology. Springer Verlag. In press

¹⁴ However, these results cannot be used without a complementary qualitative analysis, notably due to the interaction, which is difficult to quantify, between 1-behaviours with each other and 2-determinants with each other.

¹⁵ For example, the following was regularly heard in Kinshasa: “It is important to have clean latrines so that visitors see that we are a ‘good’ family”.

¹⁶ i.e. $61\% \text{ of families have children under 5, or } 220 / (61\% \times 3800) = 0.094$

¹⁷ National Institute of Statistics and UNICEF. *Multiple Indicator Cluster Survey, Democratic Republic of Congo (MICS-RDC 2010)*. Final Report, May 2011

¹⁸ With a 95% confidence interval: 28% - 68%, which therefore needs to be clarified.

¹⁹ Families practice self-medication in around 60% of cases, often with inappropriate treatments (antibiotics, anti-worm treatment...).

²⁰ The full study, which explains the determinants of the 5 key behaviours in detail, is available on request from SOLIDARITES INTERNATIONALE

²¹ WHO, « Guidelines for Drinking Water Quality » p.120, 2008, Geneva

²² The message only targets children (but also mentions elderly people): The risk is acceptable for adults and it is more realistic that families make an effort for their children under the age of 5 rather than for all the members of the family.

²³ As for household water filtering, this is unaffordable for the majority of families. In addition, household water treatment does not become established in the long term in the majority of external operations [Hunter 2011].

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