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**WATER, SANITATION AND HYGIENE:
SUSTAINABLE DEVELOPMENT AND MULTISECTORAL APPROACHES**

**Understanding sanitation demand to
reach targets of 100 percent coverage**

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Studies have shown that while health is a major driver for sanitation projects for governments and NGOs, it is often not a motivator at the individual/household level. Significant non-health benefits of improved sanitation include environmental cleanliness, convenience and dignity. Capturing the real demand for sanitation in a community is vital to program success, but is often neglected. The EcoHealth approach is presented as a framework that enables inclusion of a variety of factors and stakeholders in a project. Using this approach, the many interrelated issues that influence the water and sanitation situation in a community can be identified and addressed. The authors present justification for targeting 100% sanitation coverage in a community. While 100% coverage has not been proven as required for improving public health, it would ensure the benefits of improved sanitation are equally accessible to the poor, who may well be unable to build toilets without intervention.

Introduction: Sanitation demand

Health is a major driver for sanitation projects by government, donors and NGOs, but it is not a significant motivator for individuals and households. This mismatch between efforts to generate demand by project implementers as compared to actual demand in the communities can lead to failed sanitation projects – or to much lower acceptance rates than targeted. A particular danger is that only the wealthy and educated participate, resulting in projects that strengthen existing social barriers. For sanitation to spread quickly and for use to be equitable and sustainable, local demand - including the factors that motivate people to construct toilets - must be understood. Understanding and addressing perceived barriers to constructing improved facilities enables projects to be directed towards those households that are unable or unwilling to construct facilities or change their defecation behaviour. Lack of attention to these groups may unwittingly further undermine their social position. Understanding motivating factors may help in understanding why it is that even successful sanitation projects rarely spread from one village to another.

Sanitation is a complex and multi-faceted subject. It includes technological, social, cultural and ecological considerations. In addition, diverse factors influence both the sanitation situation in a household, and what the household members feel they are capable or willing to change. In many cases where planning has not adequately addressed the demand, the environmental conditions, governance and policy, or the economic, social or cultural situations, the latrines installed in sanitation projects have not been used, not maintained, or become sources of environmental contamination. Understanding these factors collectively is a key to a successful sanitation project. The methodology or approach used in planning and implementing the project or study influences how relevant it is to the community, how well it addresses their perceived needs, and whether the solutions proposed are both practical and attractive to households. A comprehensive approach leads to solutions that effectively address the real drivers and constraints in the community. This paper adapts the Ecohealth methodological framework to sanitation projects and presents the results of its use in a study in rural Nepal. The study seeks to understand why sanitation projects rarely spread even when they are successful in a particular village. Central to this topic, the study examines the perceived motivators, barriers and learning pathways that contribute to household decisions about building toilets.

The Ecohealth approach

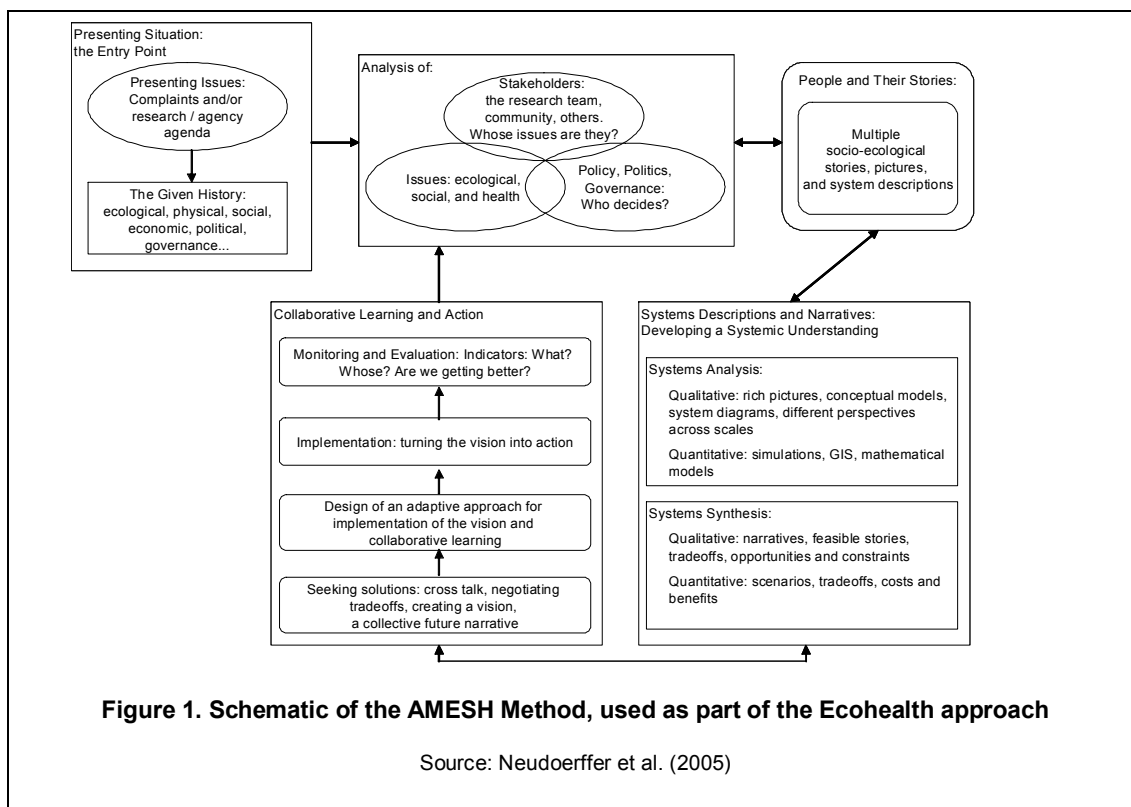
The Ecohealth approach has been developed in recognition of the inextricable links between people and their biophysical, cultural, social and economic environments and the collective influence of these on human health (Lebel, 2003). The approach systematically addresses and includes a multitude of disciplines and stakeholders into a project planning or evaluation. The pillars of the approach are community participation, transdisciplinarity and equality. The approach focuses on the identification of all stakeholders: groups, sub-groups, institutions and organizations that influence the existing situation. All of these stakeholders may also have a role to play in identifying and implementing effective interventions or solutions. The Ecohealth approach was originally developed by IDRC (Canada) in the context of infectious diseases, and has more typically been applied to larger-scale, multi-disciplinary studies involving environmental and human health (Lebel, 2003; www.idrc.ca/Ecohealth). This study tested the approach in a smaller scale application, being applied in the small study on sanitation in Nepal described above. This meant a focus on health and water. Due to scope constraints and the nature of traditional project implementation cycles, project initiatives in communities often address one or two components in relative isolation: e.g., focussing on improved water supply while not improving sanitation and hygiene, or promoting latrines while not understanding all the factors that act to prevent people from building latrines. Both topics of health and water benefit from this transdisciplinary approach.

Health, including well-being, is a highly interdisciplinary topic, and depends on a number of interrelated factors just related to water and sanitation alone, including: safe drinking water, safe water storage, sufficient washing water, sanitation, hygiene, waste disposal, and wastewater disposal. Focussing on improvements in any one of these areas can lead to improvements in health, quality of life and livelihoods. However, to achieve maximum health improvements and reduce environmental deterioration, all of these interrelated topics should be addressed. Furthermore, if they are not considered in an integrated fashion, changes intended to improve one aspect in isolation of the others may end up causing harm via another route, such as the introduction of latrines that pollute drinking water sources. This is particularly challenging when different governmental departments, or different aid organizations, divide responsibilities among themselves and then do not inform one another of what type of interventions they are introducing in a particular place.

Water - and even more so sanitation - are personal, complex and sensitive topics. There are many factors that may prevent people from taking up a technology or new behaviour promoted to them. Conditions or incentives that may enable or motivate an individual to improve their practice or existing technology may not be what is originally assumed will enable or motivate them. Anticipating and understanding all the factors that influence people's decisions about water and sanitation at the community and household levels is a critical and integral part of any project planning process. This requires consideration of a number of influences, attitudes, stakeholders and processes that may seem unrelated at first, ranging from family traditions and preferences to political and social systems. There are also a number of ecological factors related to water that need to be considered to hinder that well intentioned projects do not contribute to worsening environmental, including human health.

The Nepal study draws on a methodology developed within Ecohealth – the Adaptive Methodology for Ecosystem Sustainability and Health (AMESH). AMESH includes five steps described below and outlined in Figure 1 (Neudoerffer et al., 2005, Walter-Toews et al., 2004, Waltner-Toews and Kay, 2005):

1. An entry point and initial description of the situation; includes a review of historical and background documents, maps, previous research, etc.;
2. An analysis of relationships between stakeholders, issues and governance; stakeholder analysis, ecological and social analysis, and policy and governance analysis;
3. Extraction of narratives and system descriptions; derived from methods in the previous step (interviews, group discussions, participatory action research methods, etc.); identification of categories emergent from the narratives, for example, stakeholders, their activities, resource sates, and perceived needs and concerns;
4. System analysis and synthesis; analysis of stories and perspectives shared, and creation of issue and influence diagrams for each perspective or stakeholder group; synthesis or combination of individual diagrams into a complex, integrated system diagram;
5. Translation of synthesis into ongoing collaborative learning and action; sharing diagrams and results with the community, helping them identify relevant areas for interventions, and empowering them to create changes to achieve their stated goals.



In the Nepal study, a field investigation was conducted using household interviews, group discussions, key informant interviews, casual conversation and observation to gather information about the existing sanitation situation. Then, a stakeholder analysis, ecological analysis, social analysis and political analysis were done. The results of the data collection and the stakeholder, ecological, social and political analyses were then compiled and transformed into issue-influence diagrams. A diagram was created for each of the following stakeholder groups: villagers using no toilet or “temporary” toilets (a local term indicating unimproved pit latrines); villagers using “permanent” toilets (local term, generally includes simple pit latrines or pour-flush latrines); community leaders (including teachers and volunteer health workers); and NGOs/government. For each stakeholder group, the diagrams highlighted:

- Needs - defined as an actual or perceived lack of resources that prevent members of a stakeholder group from improving their sanitation situation (e.g., in the case of villagers with no toilets), or a social need / desirable social condition, the achievement of which is a motivator for members of one stakeholder group to assist members of another group to build toilets and thereby improve overall community sanitation, comfort and health;
- Assets - defined as skills, attitudes or physical assets held by members of the stakeholder group which enable them to become involved in improving their own or others’ sanitation situation;
- Activities and associated consequences/impacts.

The diagrams provide a means to analyse which issues are prioritized by each stakeholder group, and how these priorities relate to those held by other stakeholders. The combined diagram, also based on the Nepal study, incorporates all stakeholder groups and issues. The diagrams illustrate that the practices of each person or group have public consequences that affect all stakeholders or community members. The villagers with permanent toilets, community leaders, teachers, health workers, NGOs and government all have roles to play in supporting and assisting the villagers without toilets to build and use them, whether this is by providing funds, training, or creating social pressure. Similarly, it becomes apparent that the benefits gained by villagers when improvements are introduced to household sanitation are shared by the entire community in terms of health and well-being.

Creating the issue/influence diagrams helped to clarify the influencing factors and roles of each stakeholder group. The completed diagrams are useful for:

- visualization of issues and influences with respect to sanitation in the community;
- visualization of the interconnections between stakeholder groups;
- identification of potential intervention points; and
- as a tool to take back to the community for triangulation/ confirmation of the results, interpretation of the data and the their own understanding of the situation.

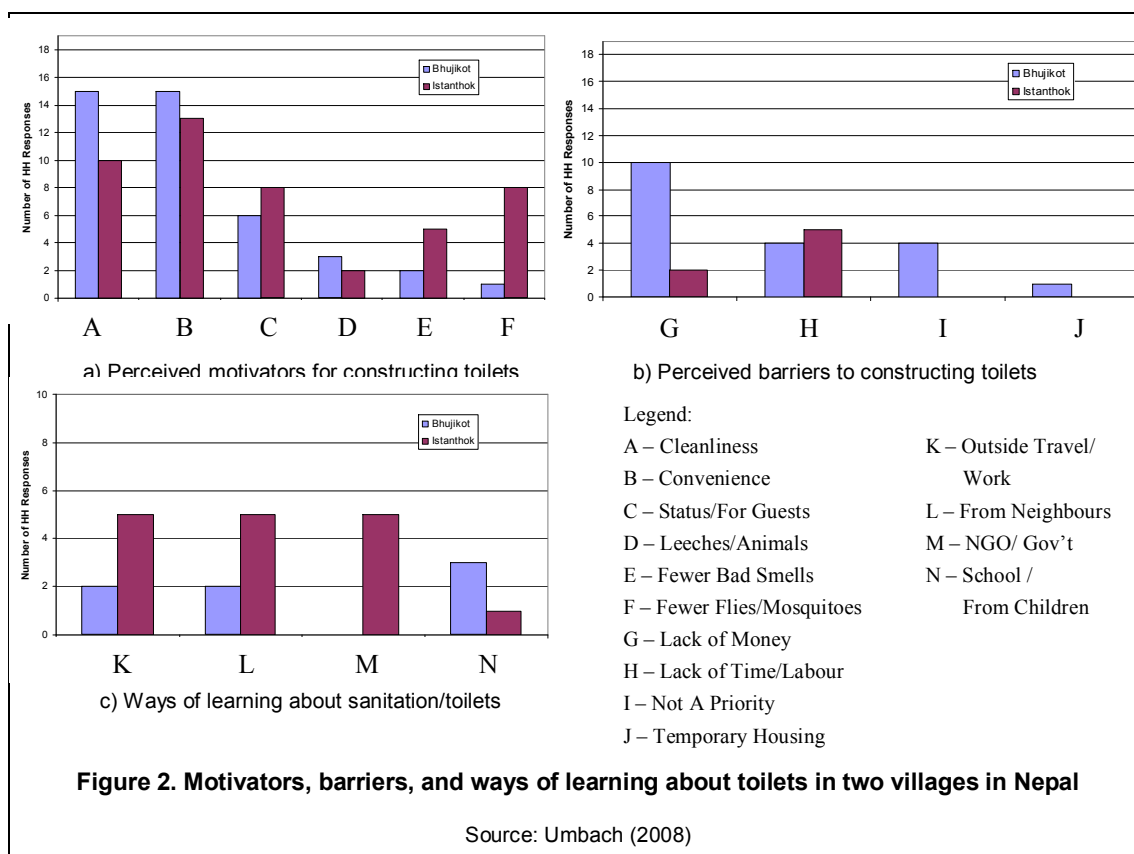
In general, the AMESH methodology was found to be a effective and valuable framework for analysing the sanitation situation in a community and the multitude of factors that affect it. The five steps provided a clear guidance to collect and organize the data using stakeholder, social, ecological, and political analyses. The multiple data collection methods and the multiple analyses enabled collection and inclusion of many different factors, disciplines, influences, systems and perspectives. By including and considering all these factors in the planning stages of a project, the likelihood of the project being more appropriate, accepted, effective and maintained is increased. The methodology could similarly be applied to any project (or evaluation, study) requiring assessment of many interrelated factors, with many stakeholders who affect the situation.

Understanding the demand for sanitation

In the Nepal study, the primary benefits or drivers for building toilets were found to be cleanliness (of the environment and surroundings), convenience (close to the house, easy to use when sick, in the rain, at night and for the children and elderly), status (including having a toilet for the use of guests and “keeping up with” the neighbours), reductions in bad odours and mosquitoes, and safety/convenience from insects and leeches. This is in line with the findings of a Water and Sanitation Program (WSP) paper (Jenkins, 2004), which determined that nine out of eleven identified drivers for latrine construction/use were related to prestige and well-being. Similarly, a study in the Philippines found that that the top two benefits of having latrines that people cited were the absence of bad smells and flies, and cleaner surroundings; privacy was third, less embarrassment in front of guests was fourth, and finally less gastrointestinal illness was fifth (Cairncross, 2004). Also in a study in Benin, the top motivators were related to convenience, prestige and safety; health benefits were cited last (ibid.). Other studies that have yielded such results are reported in NEWAH (2004), WHO & UNICEF (2006) and UNICEF (2006). Often, many factors assumed to be motivators for individuals to improve sanitation do not actually play large roles, while factors that may not have been predicted to influence a household’s decision do.

Despite these findings, the target of most sanitation promotion campaigns and programs continues to be improving health, which is mismatched with the community’s perceived needs and motivators (Cairncross, 2004; Jenkins, 1999 & 2004). A study in Pakistan showed that the needs, desires and expectations of the local people at four study sites were not matched with the policies, benefits, institutions and understanding of the issues by the government and NGOs, resulting in sanitation systems that were not used (Nawab and Nyborg, 2008). While health is (and should be) a major motivating factor for NGOs and governments (health is universally recognised as a core human right, and public health (including sanitation) as a responsibility of the state¹), this needs to be matched with community and household interests (UNDP, 2006). While the Ecohealth approach can capture the importance that the government policy plays in promoting sanitation and health through the political analysis component, it can also identify the local drivers and barriers for improving sanitation practices within a community.

The perceived barriers to building a toilet were found to be: lack of money; lack of time/labour; and having other household priorities. The relative frequencies that the motivators and barriers were reported are shown in Figure 2 (a, b). These findings suggest that money is a real barrier to poor households who want a toilet but cannot afford the time or money to build one. In such cases, subsidies and outside resources may be required and appropriate.



A study from Uganda which focuses on the question of equity in relation to water and sanitation projects found that while technological and ecological factors tended to influence which technology was used, it was political influence that tended to be the most important factor in determining whether or not funds were allotted to particular projects. The project reveals that these decisions are made with low levels of information and consequently high levels of uncertainty. The authors suggest that equitability thus is greatly enhanced by increased access to information and the active involvement of local leaders (Asingwire and Muhangi, 2005). In the Nepal study, it was found that the main modes of households learning about toilets were: observing and talking to acquaintances; working and travelling overseas or in cities; from NGO or governmental training projects; and at school or from their children (Figure 2c). All of these modes of learning about toilets provide potential users with information. Another instrumental factor in creating demand for improved sanitation was the impact of social pressure – from both within the community and from outsiders (e.g., people coming into the community to raise awareness about building toilets). In addition, active promotion of sanitation through school curriculum, school class home visit programs and sanitation clubs were found to be effective agents of change for sanitation behaviour, both through educating the community and creating social pressure. Informed stakeholders are more apt to be able to interest NGOs and politicians in making investments.

Implications for sanitation coverage targets

The ecohealth approach can help implementers achieve a holistic understanding of the community, the factors influencing the sanitation situation, and the existing demand for sanitation. Implementing projects with full participation according to what is learned out of the ecohealth approach can lead to more effective, appropriate and successful projects. However, even if a government or organization understands and addresses the demand for sanitation in a community, they will still require targets for sanitation that relate to their own health-oriented goals. Despite the general recognition of the importance of sanitation to improve health, the effect of the chosen latrine type and the extent of sanitation coverage in an area on public health are still poorly understood. Several published studies have attempted to assess the impact of improved water and sanitation on health. In an historical study on the impact of improved water and sanitation on the inequalities in child mortality in Stockholm in the period 1878-1925, the authors show that investments in water and sanitation eventually eliminated the risk of dying from diarrhoeal diseases among all social classes

(Burstrom et al. 2005). Esrey (1991, 1996) and Fewtrell et al. (2005) show that improved sanitation practices correspond to improved health, with an approximate one-third reduction in diarrhoeal disease with improved sanitation, a one-quarter to one-third reduction with improved water, and about a one-third reduction with combined water and sanitation.

There are very few studies that examine the health impact of the level of sanitation coverage in a geographical area (for examples see Sanan & Moulik, 2007; Bateman & Smith, 1991 and Wibowo and Tisdell, 1993). If a few households in a village or rural area are still practicing open defecation, and the neighbours do not consider it a problem to them, does it really matter? Do these people necessarily need to build toilets – should they be targeted by sanitation programs until they build?

Bateman and Smith (1991) purport that for maximum health impact, a majority (about 75%²) of households in a community should be using improved sanitation. The Water and Sanitation Indicators Measurement Guide, a US-based Food and Nutrition Technical Assistance Project funded by USAID (Billig, 1999), quotes Bateman and Smith's figure of 75% sanitation coverage as an appropriate target for sanitation projects (pg.16). The 75% figure is becoming established before it has been thoroughly discussed. In contrast to the Bateman and Smith study, a WSP field note (Sanan and Moulik, 2007) indicates that significant drops in diarrhoea incidence occur only when 100% sanitation coverage is attained.

The impact of sanitation on health is inextricably linked to available water quality, water quantity and hygiene practice. Wibowo and Tisdell (1993) calculate functions for water-borne disease and diarrhoea morbidity based on both water coverage and sanitation coverage. They conclude that for any target level of morbidity, there are corresponding minimum levels of safe water and sanitation necessary. They assert that even with 100% coverage of both safe water and sanitation, it is unlikely to eliminate water-borne diseases altogether, due to habitat and other socio-economic factors. Their results show that improvements in both water and sanitation are required to reduce morbidity significantly. Their results are not clear, however, with respect to which levels of sanitation coverage result in significant improvements in health. Instead, they suggest setting combined standards for drinking water quality, water availability, sanitation coverage and level of hygiene. The plot-chart developed by Wibowo and Tisdell (1993) may be a more appropriate approach than setting separate standards. In addition, factors such as housing density, proximity of neighbouring communities and their relative impacts, toilet usage (e.g., while people are out in their fields working, do they go home to use the toilet?), topography, relative locations of drinking water sources, and land use should also be considered when evaluating the impact of sanitation and open defecation on public health.

The lack of health impact studies, the complex factors affecting sanitation uptake, and the difficulties in reporting sanitation coverage, have created some confusion and disagreement globally over what sanitation targets should look like, and what the best approach to achieve them is. Based on this study and other literature, there are several points supporting the argument that maximum health benefit can only be achieved at 100% sanitation coverage. The prevalence of diarrhoeal diseases during the summer/monsoon season is widely acknowledged both by local people and the academic/institutional community (Pokhrel, 2004; UNICEF, 2006). This is due to the spreading of excreted organisms (from open defecation) by rainwater runoff. If there are even a few people practicing open defecation, it is logical that this may affect the whole community via contaminated surface and drinking water. The results of the Bateman and Smith study (1991) show that the relative impact of overall community sanitation coverage is a more important determinant in individual health than is individual access to improved sanitation. Providing all households with access to improved sanitation would contribute to decreasing the social disparity created between those with toilets and those without, therefore contributing to increasing overall public health in the community (CSDH 2007).

Further, which level of sanitation coverage is seen as optimal has significant impacts on policy and project implementation. While the literature is unclear as to the optimum sanitation coverage for a reduction in diarrhoea incidence, there are justifications for targeting 100% sanitation coverage in a community. Bateman and Smith (1991) have stated that "the most important goal and evaluation indicator should be achieving a community level of sanitation in which at least 75% of the people have access to sanitary facilities and uses them properly" (pg.1522). However, if projects and targets are designed with such a coverage level in mind, will the last 25% be left behind? It seems reasonable to assume that the last 25% to build toilets (the "sanitation stragglers") may often be the poorest in the community, the elderly and the uneducated who lack the funds, time, physical means and information to build, meaning they may be the ones most in need of help. One danger in accepting an optimal level of coverage below 100% is that it may result in those most in need of help being forgotten, or worse, ignored, and left without help should they want to build a toilet.

Finally, it should also be kept in mind that regardless of whether maximum benefits to the community in terms of disease reduction may be achieved at 100% coverage or less, there are other benefits to improved sanitation besides preventing illness, which in themselves make it worth targeting 100% coverage. Achievements of these benefits, which include cleanliness, convenience, and status, are included in the general definition of health (WHO, 2006, 2007). Such benefits should be made accessible to the whole community on a human rights basis, and need to be considered when assessing potential projects and the benefits of a sanitation program for a community. Using an ecohealth approach can help capture such benefits, and involve the community in sanitation decisions which leads to greater success.

All these benefits should be equally accessible to the poor who may well be unable to build toilets without external intervention. They may require support for materials or time and labour, or may lack motivation for building a toilet without the creation of social pressure. Again, the ecohealth approach can ensure these barriers are identified and addressed appropriately. If the required motivation and/or support are not provided, social division within the community may continue to widen, reinforced by categorizations based on those who have toilets and those who do not. Many of the poor, already disadvantaged in the bottom socio-economic strata, will likely be relegated into the bottom “sanitary strata”, because they do not have the means to build a toilet. A new category for social wealth ranking could emerge, namely those with and those without toilets. To avoid this happening, policies and programs which support sanitary facilities for all need to be introduced and practiced.

Conclusions

At the end of the day, sanitation is not only about the complex topics of health and water. Sanitation is about dignity and social cohesion. Sanitation is about equity and development. Improving project implementation so that demand is understood, the motivators are harnessed and barriers are overcome at the household level is vital. The Ecohealth approach is one methodology that enables a multi-disciplinary assessment of an existing situation and identification of the actions and interventions that would be most effective in improving it.

In the midst of the ambiguity surrounding the impact of sanitation facility type and coverage rates, governments, organizations and the international community have practical interests in developing and applying definitions, categories and concrete targets for such issues. The tendency for these actors to state quantified targets, quote impacts and draw inflexible lines of classification, while perhaps justified to enable standardization and coordination, often stands in contrast to the inadequate quantity and quality of available data. They in themselves contribute to poor information – and therefore to the high level of political influence in allocation of projects. There is a need for more research on the impacts of and demand for sanitation, to provide a more solid foundation for such targets and subsequent policies. When we get the numbers wrong and use them anyway, it is the poor who will be most affected. The world cannot sit and wait for more research, however. If the Millennium Development Goals for sanitation are to be met, the pace of sanitation coverage must be accelerated in several countries world-wide. Targeting 100% sanitation coverage is justified to ensure social equity and prevent the very poor from being left behind as sanitation stragglers.

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Notes

¹ According to the WHO Declaration of Alma Ata in 1978 & WHO (2006, 2007)

² Calculated using Relative Odds Ratios based on anthropometric data collected for over 2000 children from across Guatemala.

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