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Exploring the Potential Synergies of
Household-Based Interventions to Improve
Drinking Water Quality and Indoor Air Quality

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EXPLORING THE POTENTIAL SYNERGIES OF HOUSEHOLD-BASED INTERVENTIONS TO IMPROVE DRINKING WATER QUALITY AND INDOOR AIR QUALITY

[NOTE; This is a request for comments from Eva and Bruce, from the WHO. Her letter precedes the document itself. The deadline for comments on this document is July 20th – so please can you send comments directly to Eva and Bruce as soon as possible as well as discussing the wider issues of the integrated approach during the conference]

Dear colleagues

What is the benefit of reducing indoor air pollution to prevent a child from having pneumonia if, two months later, that same child becomes sick or even dies of diarrhoea because of unsafe drinking water?

This rationale lies behind a move towards more integrated approaches to addressing environmental health issues, in particular in the home environment. One might argue that it is difficult enough to implement household water treatment interventions, to set up sanitation facilities or to run improved stoves programmes one at a time, yet we believe that there are important synergies in the delivery mechanisms that should be explored and might ultimately allow us to achieve greater health gains. With funding from the USEPA's Office for Children's Health Protection, WHO would like to test, through two or three pilots in Africa, whether the joint implementation of household water treatment and indoor air pollution interventions works. Please note that we are placing the emphasis on testing a hypothesis (i.e. added value of joining up interventions) rather than on achieving health impacts on a large scale.

As a first step, we had asked two researchers at the London School of Hygiene and Tropical Medicine to develop a short concept note. Tom Clasen, an expert on point-of-use water treatment and strategies for scaling up, and Adam Biran, a social researcher with a focus on household environmental health including indoor air pollution, have developed the attached short concept note. Its purpose is to provide an objective analysis of the different synergies related to jointly implementing two specific environmental health interventions. In addition, the concept note outlines options for how to set up pilots.

This concept note will provide the basis for a Request for Applications to be lauched in September. We would greatly value your feedback on the analysis and the feasibility of implementing household water treatment and indoor air pollution interventions jointly. Please share this message with organizations and colleagues, especially those working on implementing interventions and potentially interested in conducting a pilot in Africa.

*Please send your comments by **20 July 2007** to Bruce Gordon (gordonb@who.int) and Eva Rehfuess (rehfuesse@who.int).*

Best wishes
Bruce and Eva

Concept Note for Pilot Projects

1. Purpose

The purpose of this concept note is to outline (i) some potential synergies and antagonisms that may arise by combining household water treatment (HWT) and interventions to improve indoor air quality (IAQ) (ii) some potential models for combining interventions, (iii) policy questions and a potential way forward for learning about the effects of combining interventions in practice.

2. Background

Two interventions implemented at the household level—point-of-use water treatment and interventions to improve IAQ offer the potential to make substantial gains toward the achievement of Millennium Development Goals 1 (eradicate poverty), 4 (reduce child mortality), 5 (improve maternal health) and 7 (environmental sustainability). Household water treatment provides a means by which the world's 1.2 billion people without access to improved water supplies can take charge of their own water security, and has been shown to deliver significant reductions in diarrhoeal disease, a leading killer especially among children under 5 years (Clasen et al. 2006). At least 2.4 billion people depend on biomass fuels (wood, dung, agricultural residue) and coal to satisfy their domestic energy needs. Indoor air pollution from the incomplete combustion of these fuels is the cause of an estimated 1.5 million deaths annually, mainly among children under 5 and women (Rehfuess et al. 2006). Changes in stove-fuel combinations, the use of fuel-free solar cooking technologies or retained heat cooking technologies such as the hay-box and/or the removal of smoke by means of flues, chimneys and improved household ventilation are some of the means by which IAQ can be improved. Simple methods of treating water in the home have also been shown to deliver considerable savings over purchasing or boiling drinking water. Encouraging householders to adopt alternatives to boiling their drinking water can also reduce greenhouse gases and may, in some locations, reduce pressure on local forests, reducing further environmental degradation. The production and sale of technologies for HWT or IAQ are can offer income-generating opportunities for local entrepreneurs.

Despite the promise of these interventions, neither HWT nor improvements in IAQ have succeeded in reaching significant scale in low-income settings globally. Efforts to encourage adoption of simple, affordable HWT options such as disinfection with household bleach (sodium hypochlorite), ceramic filtration and solar disinfection have collectively yielded fewer than 8 million regular users, or less than 0.1% of those without access to improved water supplies. Boiling is widely practiced in certain Asian countries, but without safe storage, it leaves water subject to contamination. Furthermore, boiling using coal and biofuels on open fires or inefficient stoves aggravates the problems of IAQ. Two large-scale improved stoves programmes in India and China that started in the early-1980s have disseminated large numbers of improved stoves, in China more than 200 million stoves have reached the majority of rural households. In most countries, however, the production and delivery of more than 100 000 improved stoves can be considered a major success.

Recent progress in the social marketing of sodium hypochlorite for household-based water disinfection and the commercial production and sale of various types of improved stoves (e.g. the rocket stove in Uganda, the ceramic jiko in Kenya / Sudan) provide some evidence of the demand for these products even at full cost recovery. Nevertheless, the health, poverty reduction and environmental benefits that these interventions offer will not be fully realized unless successful strategies can be identified and implemented for increasing their acquisition and regular use.

3. Settings-based approaches and integrated approaches

Experience has shown that in some circumstances integrated approaches can increase the effectiveness of health initiatives. Combining control strategies for HIV/AIDS and tuberculosis has lead to increased coverage and effectiveness and lower costs (Harries et al. 2002). Case management of childhood illnesses has been enhanced through the Integrated Management of Childhood Illness (IMCI). Integrated approaches have also been advocated in environmental health, including programmes supported by UN Habitat, the WHO-backed Healthy Environments for Children Alliance (HECA), healthy housing and the Millennium Villages. However, these programmes mainly address the potential for synergies in health outcomes that could be realised by the integrated removal of multiple risk factors from the settings in which children spend their time. Less thought has been given to the development and testing of integrated delivery mechanisms for environmental improvements.

Settings-based approaches (for example the Healthy Schools and Healthy Cities initiatives) are frequently discussed in health promotion literature. Their prominence arises from two lines of thinking. One, on a practical level a setting such as a school or a workplace provides a contact point with a target audience that may be harder to reach in other ways. The audience is to some extent captive and is also present over a number of years. Thus certain settings can be convenient starting points for campaigns to change individual behaviour. The second line of thinking is the recognition that characteristics of settings in which people interact can constrain or facilitate particular behaviours with consequences for health. Within health promotion an idea developed that while health systems could combat disease the creation of ‘health’ required attention to characteristics of social and physical environments.

Settings-based approaches are integrated approaches in the sense that they have multiple components, often aiming to change individual behaviour, reduce exposure to risk factors in the environment and manipulate the environment in such a way as to achieve outcomes regarded as ‘health producing’.

It is tempting to see the integrated promotion of household environmental health interventions as settings-based since the household is a setting in which women and children spend considerable amounts of time and in which they are exposed to a variety of environmental risk factors. However, this would be misleading. It is not useful to think of the household as the setting for the intervention since i) each household represents a very small fraction of the target audience and ii) it is not the aim of the intervention to influence interactions within the household setting.

When thinking about the integration of interventions it may be useful to distinguish integration at the point of impact, integration in intervention delivery and integration at a higher, strategic or programming level. Integrated strategic planning

and integrated household level impact may or may not be best served by integrated design and delivery of interventions. The main purpose of the proposed work is to explore the issues related to integrated delivery of household environmental health interventions and to document the synergies and antagonisms that are encountered. The following section summarises a number of potential synergies and antagonisms.

4. Potential for Synergy

The motivation for integrating two or more household environmental health interventions (such as HWT and IAQ) is the prospect that is that a combined intervention could achieve more per unit of input than two interventions run separately. The intervention process may offer various opportunities for synergy but also potential for antagonism between combined interventions. Some of these possibilities are discussed below. The potential for synergies and antagonisms will depend to a great extent on the technologies and intervention methods used and these are likely to vary according to the cultural, social and economic setting as well as the skills and experience of the implementing agency.

4.1 National policy and approach. Interventions aimed at improving HWT or IAQ already suffer in some cases from a lack of coordination between government ministries (e.g., water and health or energy and health). Thus, efforts to integrate the two interventions may face even greater challenges. Integration may be advanced through national initiatives, plans and policies. Examples include poverty reduction strategy papers and national development plans in developing countries; environmental health action plans in Europe..

4.2 Situation analysis. Baseline assessments of health problems, existing household technologies and practices, householders' priorities and finances as well as more general information on the social, cultural and demographic make up of the target population need not be done repeatedly. Much of this information is not specific to particular interventions and that which is (e.g. the sorts of stoves / water treatments that are currently in use) would probably be relatively easy to collect without overburdening the data collection process. Thus with a degree of planning it should not be problematic to conduct a situation analysis that is relevant to more than one intervention. In some circumstances this might require additional equipment or staff training, for example to collect data on water quality and on indoor air pollution levels requires knowledge of different techniques and access to different equipment.

4.3 Technology development. A single technology that addressed more than one household environmental health problem might be considered a synergy. For example, stoves have been designed to use excess heat for pasteurizing drinking water (Islam & Johnson 2006). Although the development of the technology may not be synergistic itself (i.e. it may be more efficient to develop a technology that addressed just one problem) it might allow synergies at later points since addressing supply chains and promotion might focus on only one product. However, there may be problems and disadvantages associated with combined technology development since the technical expertise for different technologies are likely to lie with different groups of people and there is the possibility that a technology designed to address two aims may be a compromise that addressed neither as effectively as a more specialised technology.

4.4 Technology production. If the technologies are made using similar materials / processes and are produced by the same people (for example manufacturers of ceramics making both ceramic stoves and ceramic filters) this could reduce the numbers of people to be trained, making training more efficient but

resulting in fewer trained people (perhaps less desirable from a capacity strengthening / poverty reduction perspective).

4.5 Technology sale. The production and/or sale of more than one technology offer businesses opportunities to diversify and add to their range. This might help to ensure profits and add to the sustainability of the business. This might be particularly important for small artisans in rural areas where low population density and limited transport and communication infrastructure restricts the size of the market.

4.6 Outcome. An intervention to address one environmental health outcome might have knock-on effects for another outcome. For example, promoting an alternative to boiling water might result in less fuel consumption and less indoor air pollution if boiling water is a significant component of indoor biomass-fuel use. Similarly, an improved water supply that brings water closer to the home might reduce the need for storage and the associated potential for contamination and also increase the amount of water used for household hygiene practices and hand-washing.

4.7 Behaviour change promotion and technology promotion. Communication for behaviour change requires developing and delivering a message. Message development requires identifying target audiences, understanding their current practice, understanding the constraints to change and understanding the motivations that might encourage change. These understandings are probably easiest to generate and of most use when they are specific to a particular practice. This limits the potential for synergy. However, the techniques for generating these understandings are likely to be the same regardless of the behaviour targeted. Thus there is potential for synergy in identifying research agencies and / or training in research techniques. It is possible that the messages to promote a POU water treatment intervention will use similar motivations to one that promotes an improved stove (e.g. modernity, status, nurture/health) but this cannot be assumed and would have to be uncovered through careful formative research.

Similarly, where a community mobilisation approach is used the structures put in place or utilised for promotion of one technology or behaviour might subsequently be employed in the promotion of another.

Delivering a message requires identifying the most appropriate channels for communication. While the most appropriate channel might vary depending on the intervention and the budget, information about existing channels could be usefully shared between interventions.

A general rule of communication for behaviour change is to focus on a single behaviour. Attempts to change two practices simultaneously may result in antagonism as the messages compete with each other for the attention of the target audience.

It may be that a brand successfully developed for one intervention (technology or behaviour) can be usefully extended to other technologies or behaviours (For example the ‘Virgin’ brand has been applied to music, soft drinks, travel and financial services. Successful branding has helped the company to diversify and grow. However, whether the inclusion of say, financial services in the company’s portfolio has helped it to sell more music may be debateable).

4.8 Technology distribution/supply chain. There may be potential for synergy in the use of distribution networks and outlets. Again this would depend very much on the technologies being promoted, depending on whether the technology is produced locally or, for certain critical components, centrally. In addition, factors like size, robustness and cost and speed of turnover all have implications e.g. for transport, storage, shelf-space and appropriate point of sale. There are examples of interventions using 'one-stop shops' to provide sanitation technologies and there may be potential to extend this concept to cover other household environmental health interventions.

4.9 Household finance and purchasing power. Interventions based on the sale of new household technologies might face similar constraints in terms of the finances available to households. The use of some form of micro-credit scheme to facilitate access to one technology therefore might synergistically facilitate access to another. The potential for antagonism also exists since the two technologies may compete for the same pot of household money.

4.10 Education / awareness-raising. Although education and awareness-raising about household environmental health issues are not necessarily the best ways to achieve rapid behaviour change it can be argued that when effective interventions exist people should be educated about the existence of health threats and the means by which they may be averted. As with other forms of behaviour change promotion there is potential for synergy in developing and delivering communication materials and also potential for antagonism in providing too much information at one time. This antagonism could be avoided by a careful design with very few clear messages and a suitable, progressive, staged approach.

4.11 The perspective of an implementing agency. The identification of potential synergies needs to take account of the aims and priorities of the various actors. An agency whose brief is to improve household environmental health may benefit from the simultaneous promotion of technology or behaviour change interventions to address more than one exposure. However, an agency whose brief is to deliver a single intervention will need a convincing reason as to why it would be beneficial *for them* to pursue an additional intervention.

Some interventions may stand to benefit from addressing multiple issues. For example the Health Clubs approach, used in Zimbabwe and elsewhere (Waterkeyn & Cairncross 2005), relies on delivering an ongoing curriculum of activities to attract and maintain the interests of club members. Although activities are carried out sequentially rather than simultaneously, the addition of IAQ and HWT interventions to the club's programme of work might bring benefits across the club's activities.

4.12 Achieving health impact. Successfully addressing multiple household environmental health exposures should have a greater impact on child morbidity and mortality than addressing one alone. However, it is also likely that, because of the direct impact of diarrhoeal disease on nutrition, successful interventions to prevent diarrhoeal disease will have a greater impact on respiratory infections than vice versa.

5. Establishing Priorities and Project Criteria

The foregoing suggests some of the potential synergies between household-based interventions to improve drinking water quality and reduce IAP. In evaluating projects seeking to explore such synergies, however, it is necessary to consider

priorities and adopt criteria to guide possible approaches. This section raises some of these issues.

5.1 Policy priorities. As noted in Section 2 above, interventions to promote HWT and IAQ potentially address a number of important policy priorities, including reducing poverty, improving health and enhancing environmental stewardship. To date, however, the emphasis of interventions to improve drinking water quality has been to improve health. The focus of improved stoves, on the other hand, has changed from an attempt to reduce energy consumption and preserve forest cover in the 1980s and early-1990s to a growing emphasis on the health impacts of indoor air pollution. While the WHO's priority is health, there may be additional entry points for these technologies in a given country or setting, such as scarcity of wood fuel, women's development, and greenhouse gas emissions reductions, that could add weight to the health argument The messages that can be used to attract householders to both interventions can perhaps be used regardless of the policy priority being advanced. However, potential conflicts may arise in actual practice, such as a policy that encourages improved stoves for boiling drinking water to achieve health gains when filters may be cheaper, more effective and more environmentally sustainable even though they might exhaust resources available for a stove.

5.2 Target population. HWT interventions have targeted populations who have sufficient quantities and access to water, but whose water supplies are microbiologically unsafe. Much of the coverage to date is in urban and peri-urban settings where social marketing campaigns can achieve greater efficiencies and supply chain issues are more manageable. In different countries, improved stoves have been targeted at both urban and rural populations. Given that half the world's population relies on biomass fuels and coal for their basic energy needs, it should be possible to identify a combined target population. However, if the strategy is to provide optimal gains, it must be directed at a population that is particularly vulnerable but which can also be reached by the selected approach.

5.3 Cost recovery and pricing. One factor that will determine whether a given strategy will reach the target population is whether the beneficiaries will be expected to contribute all or part of the cost of the intervention. Cost recovery is a common consideration in designing public health programmes. The debate over public/donor funding of health interventions perhaps came into clearest focus in the case of insecticide-treated nets for preventing malaria and the policy adopted by Roll Back Malaria (RMB 2005). Some argued that the nets should be distributed to targeted populations free of charge to accelerate coverage much like vaccines. Others advocated for targeted subsidies only, in order to encourage existing commercial distribution and help ensure sustainability. Both approaches are currently pursued for both HWT products and improved stoves: in most cases HWT technologies are at least partially subsidized, while promoters of improved stoves now generally seek to avoid such subsidies on the technology (i.e. the improved stove, smoke hood or haybox) in order to enhance sustainability. On the other hand, improved stoves programmes do not attempt to achieve cost recovery in terms of marketing, research and development and project/programme administration. Effective pricing strategies can increase uptake of public health interventions, and cost-recovery tends to attract donors due to improved prospects of sustainability. These advantages are weighed against the need to secure coverage among the most vulnerable populations, often resulting in multiple strategies for different settings.

5.4 Product Compatibility. Among HWT options, the solution that has achieved the highest rates of coverage to date is also one of those with lowest costs and is the least "hardware" intensive--sodium hypochlorite (liquid bleach) sold in 150ml plastic bottles. Improved stoves, on the other hand, are relatively high in price and hardware, much like ceramic or biosand filters used in household water treatment. It is possible that the differences in these products will drive an integrated strategy toward products that are more compatible with each other, and that this will not always serve the best interests of householders when considering the interventions independently.

6. Possible Models

Consideration must also be given to the platform from which an integrated programme would most effectively be launched. There have already been attempts to integrate HWT and IAQ products or programmes.

A World Bank project in Bangladesh aims to utilise community mobilisation structures put in place for sanitation promotion as the basis for an IAQ intervention. The interventions take place sequentially but the mobilisation process is expected to be faster and more efficient when used for a second time (Rouse pers. com. April 2007).

Enterprise Works in Ghana promotes both improved stoves and water filters. Each of these technologies has a main component made of ceramic. Synergies are achieved by using the same manufacturers, distributors and retailers for stoves and filters and by using the existing Enterprise Works staff and resources to facilitate this process. Although the marketing of stoves and filters relies on different messages, the products share a brand image that is recognised and valued by consumers.

In Peru a GTZ – PAHO project to improve access to sanitation and potable water incorporated the promotion of an improved stove after it became evident that indoor air pollution also represented an important health risk to the target population. It was hoped that in addition to improving indoor air quality the improved stoves, by being more efficient and more pleasant to use, would encourage the boiling of water for drinking.

The choices are to build on existing experience in one of the areas or to start anew. Does some demonstrated success in, say, improved stoves, provide a better platform for grafting on a programme in HWT, or vice versa? Does the lack of success in achieving scale with either approach to date suggest that existing organizations lack the necessary vision or skills, and suggest the need to fundamentally reconsider the prerequisites to succeed? Has the private sector been fully engaged to contribute to integrated solutions?

Some possible models for integrating intervention delivery are outlined below.

- Enter an area in which neither HWT nor IAQ has been promoted in the past. Establish single programme to do both simultaneously.

- Identify an ongoing programme that is successful in promoting either HWT or IAQ and add the second component.

- Identify a programme that has succeeded in the past for either intervention and use the structures established by this programme to promote a second intervention (as in the World Bank project in Bangladesh).

- Identify an existing approach that delivers multiple outcomes (e.g. Health Clubs, healthy housing, PHAST). Use this approach to deliver HWT and IAQ.

- Package "home" technologies through micro-finance institutions using women's self-help groups. Either for a healthy household *package* or for a menu of options. As this would be a comparatively small loan to borrowers with established reputations it may be attractive to finance institutions. This may depend on whether we are talking about expensive, at times bulky, filters and stoves or cheap, fast moving consumer goods options such as chlorine. It would also require some control over the lender so that loans are only given for efficacious products.

- Use the health system to deliver a promotional campaign for healthy home environments together with vouchers to purchase household water treatment products and improved stoves. This might be tried as a means to integrate existing, independent programmes by introducing publicly funded vouchers. The promotional campaign may be stronger if developed in collaboration with marketing professionals rather than as a traditional health education initiative.

- Develop a government campaign to reduce fuel consumption and environmental impact by (i) using improved stoves and (ii) using alternatives to boiling water. A generic, national promotion campaign focussing on HWT and IAQ could contribute to a favourable environment that may increase the effectiveness of local, independent initiatives.

- Identify existing manufacturers of ceramic stoves. Train and equip them to produce ceramic filters. The approach would also work vice versa. It should be noted that filters may require tighter quality control in order to ensure a health benefit.

7. Identifying and Piloting Promising Strategies

The foregoing summary suggests some of the areas in which HWT and IAQ interventions may achieve synergies through an integrated approach. There are undoubtedly many others that would emerge from specific proposals, not only from non-governmental organizations who have shown the most activity in these areas to date, but also from the public and private sectors who can draw on their significant knowledge and expertise in understanding the challenges and designing, developing and delivering appropriate and effective solutions. Moreover, whether or not a combined strategy for these interventions can actually deliver the apparent synergies in practice requires an assessment of their performance in a suitable setting.

In an effort to solicit creative approaches for integrating HWTS and IAP and evaluating these approaches in actual practice, we propose that the WHO initiate a Request for Proposals (RFP) and utilize its available resources to fund two to four projects on a pilot basis. The ultimate objective of the RFP process is to arrive at the most promising projects, to provide them with the resources necessary to demonstrate their capacity to succeed, and to carefully monitor their activity in order to maximize the lessons that can be learned. By encouraging serious proposals,

however, the RFP process will itself generate new ideas, products and strategies that may be combined to take advantage of the best features of different proposals.

The RFP may present a selection of countries based on the magnitude of the two environmental health problems and the availability of suitable technologies, and should make clear the magnitude of the available funding. They might also be encouraged to address the issues raised above about settings, potential areas of synergy, and programme priorities. Beyond this, parties should be free to use their best judgement about the nature, scope and term of the pilots they propose. It is important, however, to include the criteria against which proposals will be assessed.

Given the limited funding, it will not be possible for the proposals to assess the efficacy or effectiveness of interventions. With respect to water quality, established HWT interventions should be promoted. Given the more limited evidence for the efficacy and effectiveness of IAP interventions, improved stoves or other cooking technologies for which reductions in the concentrations of indoor air pollution have been demonstrated should be chosen. It is more important that the proposed pilots employ products that show promise in terms of effectiveness in the field, suitability for the setting, acceptability by the target population, cost-effectiveness, longevity and sustainability. The programmes in which they are delivered should also demonstrate that they will result in consistent and correct use by such population, may yield benefits other than the health of adopting householders, and that the pilot can be expanded to scale. Finally, each proposal should clearly identify the potential synergies it expects to explore during the pilot, why it has seized on this strategy in the proposed country/setting, what criteria it will use to determine the success of its strategy, and how it will monitor and assess its performance against such criteria.

With the resources available it will not be feasible to empirically demonstrate the relative effectiveness of an integrated approach as compared with a single intervention approach. The purpose will therefore be to demonstrate the extent to which a given approach is able to deliver both interventions, to document the process and the lessons learned and as far as possible to provide quantitative data suggesting whether the combined approach is more effective and efficient than a single-issue intervention.

8. Further Reading

8.1 Household Water Treatment

Lantagne D, Quick R, Mintz E (2006). Household Water Treatment and Safe Storage Options in Developing Countries: A Review of Current Implementation Practices (available at http://www.wilsoncenter.org/waterstories/Household_Water_Treatment.pdf

Sobsey MD (2002). Managing water in the home: accelerated health gains from improved water supply. Geneva: WHO (WHO/SDE/WSH/02.07) (available at http://www.who.int/water_sanitation_health/dwq/wsh0207/en/index.html)

WHO (2007). Combating waterborne disease at the household level. International Network to Promote Household Water Treatment and Safe Storage. Geneva: WHO (available at http://www.who.int/household_water/advocacy/combating_disease/en/index.html

The website of the International Network to Promote Household Water Treatment and Safe Storage (http://www.who.int/household_water/en/index.html) provides additional publications, other resources and useful links.

8.2 Improved Air Quality

The following websites are useful starting points for further information about interventions for improved indoor air quality.

http://www.who.int/indoorair/en/ (Website of World Health Organization)

http://www.hedon.info/goto.php/index.htm (Website of HEDON, the Household Energy Network)

http://www.pciaonline.org/index.cfm (Website of the Partnership for Clean Indoor Air)

http://practicalaction.org/?id=home (Website for Practical Action – formerly Intermediate Technology Development Group)

9. References

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Islam MF, Johnson RB (2006). Household pasteurization of drinking-water: the *chulli* water-treatment system. J Health Popul Nutr 24(3):356-62

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RMB Partnership (2005). Scaling up Insecticide-treated Netting Programmes in Africa: A Strategic Framework for Coordinated National Action. Geneva: Roll Back Malaria Partnership (WHO).

Waterkeyn J, Cairncross S (2005). Creating demand for sanitation and hygiene through Community Health Clubs: a cost-effective intervention in two districts in Zimbabwe. *Soc. Sci. Med*. 61(9):1958-70