Integrating point-of-use water quality interventions with interventions to improve indoor air quality in sub-Saharan Africa

Request for Proposal

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INTRODUCTION

1.1 Summary

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? The World Health Organization is seeking proposals to develop and implement strategies to integrate household-level interventions to improve the quality of household drinking water and indoor air in sub-Saharan Africa and to demonstrate the benefits or otherwise of integrating these interventions.

Through a request for proposal (RFP) process WHO is planning to fund two pilot projects in the range of USD 30,000-60,000 to encourage thinking about, and implementation of, innovative approaches for integrating household water treatment (HWT) and indoor air quality (IAQ) interventions in sub-Saharan Africa. These pilot projects are expected to commence by June 2008 and to be completed by November 2009.

1.2 About WHO

1.2.1 WHO Mission Statement

The World Health Organization (WHO), the United Nations specialized agency for health, was established on 7 April 1948. WHO's objective, as set out in its Constitution, is "the attainment by all peoples of the highest possible level of health". Health is defined in WHO's Constitution as a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity.

WHO is governed by 192 Member States through the World Health Assembly. The Health Assembly is composed of representatives from WHO's Member States. The main tasks of the World Health Assembly are to approve the WHO programmes and the budget for the following biennium and to determine WHO's policies.

The Secretariat of WHO is headed by a Director-General. WHO's Secretariat is staffed by health professionals, other experts and support staff working at Headquarters in Geneva, in the six regional offices and in some 120 countries.

For further information about WHO, please refer to the WHO website at www.who.int.

1.2.2 Structure of WHO

The World Health Assembly (WHA) is the supreme decision-making body for WHO. It generally meets in Geneva in May of each year and is attended by delegations from all 193 Member States. Its main function is to determine the policies of the Organization. The Health Assembly appoints the Director-General, supervises the financial polices of the Organization, and reviews and approves the proposed programme budget. It similarly considers reports of the Executive Board, which it instructs with regard to matters upon which further action, study, investigation or report may be required.

The Executive Board of the WHA is composed of 32 members technically qualified in the field of health and elected for three-year terms. The main functions of the Board are to give effect to the decisions and policies of the WHA, to advise it and generally to facilitate its work. The Board meets at least twice a year; the main meeting is usually in January, and the second is in May, following the World Health Assembly.

The Secretariat of WHO is staffed by some 8,300 health and other experts and support staff working at headquarters, in the six regional offices and in countries. The Secretariat is headed by the Director-General, who is appointed by the WHA on the nomination of the Executive Board. The current Director-General is Dr Margaret Chan. The technical and administrative head of each regional office is a Regional Director. Regional directors are appointed by the Executive Board in agreement with the relevant regional committee. Staff of regional offices are appointed by agreement between the Director-General and the relevant regional director.

1.4 Project Details

1.4.1 Background

It is estimated that 1.2 billion people globally lack access to improved water supplies and 3.2 billion people rely on biomass fuels and coal to provide their domestic energy requirements. Africa, compared to any other continent, suffers most from these environmental risks. Unsafe drinking water, inadequate sanitation facilities and polluted indoor air represent three critical risks to children's health. The high levels of indoor air pollution caused by the burning of biomass fuels and coal lead to approximately 350 000 pneumonia deaths among African children every year. Exposure to pathogens in drinking water or through inappropriate sanitation and hygiene is responsible for more than 450 000 diarrhoeal deaths among African children every year, and aggravates the widespread problem of malnutrition.

Household water treatment interventions, such as filtration, solar disinfection, combined coagulation disinfection and chlorination, and indoor air quality interventions, such as improved stoves, smoke hoods, hayboxes and cleaner fuels, take effect at household level. They both require action by householders to implement them. The target groups for these interventions are likely to overlap frequently and the challenge of achieving sustainability at scale is common to both. The biggest health impact for these interventions would be realized by children and the greatest health gains for children would be achieved by protecting them simultaneously from the hazards of poor water quality and poor IAQ. For these reasons there is interest in the possibility of integrating HWT and IAQ interventions as outlined in Annex 3: Exploring the potential synergies of household-based interventions to improve drinking water quality and indoor air quality: a concept note.

1.4.2 Objective of work to be undertaken

Pilot projects should:

- employ interventions with a proven effectiveness in improving water and air quality and related health outcomes;
- explore whether or not it is possible to achieve synergy (i.e. cost-savings and other efficiencies, greater scale) between linking HWT and IAQ interventions;
- clearly document promising integration models for IAQ and HWT interventions, such that lessons can be shared; and
- take place at a reasonable scale and/or document the potential to expand implementation significantly above current levels.

Several models for integrating interventions are discussed in a concept note which can be found in Annex 3. As WHO usually operates through the health system, we would welcome innovative ideas on how to engage the health sector with household interventions. WHO particularly encourages proposals that utilize one of the following two models, as these, if successful, could be replicated in other countries and settings:

- Model 1: Identify an ongoing programme that is successful in promoting either HWT or IAQ and add the second component. This model addresses both the demand for and supply of household technologies to improve water and indoor air quality. It would combine the advantages of an ongoing programme arrangement and existing infrastructure and delivery mechanisms with sound knowledge of and/or direct contact with the target population. If successful, this approach could become part of a larger-scale programme for delivery of both interventions at scale.

- Model 2: Use the health system to deliver a promotional campaign for healthy home environments. This model particularly addresses the limited awareness of and demand for household technologies to improve water and indoor air quality. It is best applied in settings,

where household technologies are already available for purchase - either provided for by the applicant or by other actors. A promotional campaign could use health system channels (e.g. community health workers, nurses, midwives or medical doctors) as well as marketing professionals and the media (e.g. radio, newspaper, TV) to provide information about the link between polluted household environments and children's health and available solutions to address the problem. Where applicable, this model might be combined with vouchers to purchase household water treatment products and technologies to reduce indoor air pollution.

Integrating household interventions to improve children's health will undoubtedly lead to challenges that require innovative solutions. WHO is planning to work with grantees to refine the proposal after acceptance, and to discuss any problems encountered throughout the implementation process. As problems are likely to be similar, WHO will encourage grantees to share lessons learned through periodic conference calls and at least one face-to-face meeting.

2. INSTRUCTIONS TO BIDDERS

The following instructions to bidders are provided to instruct the recipients of the RFP.

2.1 Language of the Proposal and other Documents

The proposal prepared by the bidder, and all correspondence and documents relating to the proposal exchanged by the bidder and WHO shall be written in English or French.

2.2 Cost of Proposal

The bidder shall bear all costs associated with the preparation, submission and defence of the proposal up to the final award of the contract. WHO will in no case be responsible or liable for those costs, regardless of the conduct or outcome of the procurement process.

2.3 Proposal Format and Submission

Proposals must offer services for the total requirement. Proposals offering only part of the requirement will be rejected.

The bidder is expected to examine all corresponding instructions, forms, terms and specifications contained in the RFP.

Failure to comply with these documents will be at the bidder's risk and may affect the evaluation of the proposal.

Individuals or institutions interested in undertaking the preparation of the work are requested to submit a brief proposal limiting your narrative to 5 pages or less, excluding the budget. Please use 12-pt font and include your organization's name and page number in the footer.

a) Provide statement of the project goal and objectives. Identify which country (and communities) the project will cover, what population will be reached, and explain why these have been chosen. Please note that this RFP is only for countries of sub-Saharan Africa. (maximum ½ page)
b) Provide detailed information on the expected project process and methodology, including a workplan showing milestones and deliverables with a detailed timeline. (maximum 2 pages)
c) Indicate how the programme will interact with existing HWT and IAQ programmes in the selected contexts, and how synergies between delivery mechanisms will be achieved. (maximum 1 page)
d) Indicate how the impact of the project will be monitored. Please note that, given the amount of funding provided, direct monitoring of impacts on pollution concentrations or health impacts is not expected. Instead, WHO expects to see a detailed evaluation of programmatic approaches, adoption processes and aspects related to the maintenance and continued use of the interventions. (maximum 1 page)
e) Discuss the project's risks and how you plan to address them. (maximum ½ page)
f) Provide information on your organization, leadership and qualifications for the work, and outline which organizations/individuals you expect to engage with for each major component of the project. Please include a brief summary of the experience (no more than one paragraph) for the project manager. (maximum ½ page)
g) Provide a preliminary budget for each major project component. Please note that, given the limited funding awarded, any provisions for providing matching in-kind or financial funding and/or embedding the proposal in an existing project/programme would strengthen the proposal.
h) Signed Declaration of Interest form(s) (Annex 1)

2.4 Communications during the RFP Period

A prospective bidder requiring any clarification on technical, contractual or commercial matters may notify the WHO via email at the following address **no later than 13 February 2008**.

N.B.: Co-ordinates for submission of all queries:
Email: gdwq@who.int

The WHO Technical Officer will respond in writing (via email only) to any request for clarification of the RFP that it receives prior to the closing date of the proposal. A consolidated document of WHO's response to all questions (including an explanation of the query but without identifying the source of enquiry) will be sent to all prospective bidders who have received the RFP. Questions are to be submitted in the format "Paragraph Number - Question."

There shall be no individual presentation by or meeting with bidders until after the closing date. There should be no contact with WHO officials concerning the RFP process, from the date of issue of this RFP to the final selection, other than with the WHO Technical Officer and/or Officials designated by him.

2.5 Format and Signing of Proposals

The bidder shall submit one hard copy of the complete proposal, including the signed declaration of interest, and one CD-ROM of the complete proposal to the address in section *2.6 Sealing and marking of proposals*. In addition, one electronic copy may be submitted.

Please also note the following instructions for preparation of the Proposal:

1) The CD-ROM will be treated as the master copy, and its contents will be shared with reviewers.
2) All pages of the proposal shall be numbered in the format 'Page X of Y'.
3) The hard copy of the proposal shall be typed or written in indelible ink and shall be signed by the bidder or a person or persons duly authorized to bind the bidder to the contract. A proposal shall contain no interlineations, erasures, or overwriting except, as necessary to correct errors made by the bidder, in which case such corrections shall be initialled by the person or persons signing the proposal.

2.6 Sealing and Marking of Proposals

The hard copy of the complete proposal and the CD-ROM of the complete proposal must be sent by registered mail, via courier or hand delivered, in a **sealed** envelope or parcel to the following address:

Sealed Bid
Attn: Bruce Gordon
Public Health and the Environment
World Health Organization
20 Avenue Appia
1211 Geneva 27
Switzerland

NOTE: If the envelopes are not sealed and marked as per the instructions in this clause, WHO will not assume responsibility for the proposal's misplacement or premature opening.

The electronic copy of the complete proposal may be sent to the following address:

Email: **gdwq@who.int**

2.7 Period of Validity of Proposals

The offer outlined in the proposal must be valid for a minimum period of 90 calendar days after the closing date. A proposal valid for a shorter period may be rejected by WHO on the grounds that it is non-responsive. In exceptional circumstances, WHO may solicit the bidder's consent to an extension of the period of validity. The request and the responses thereto shall be made in writing. Any bidder granting the request will not be required nor permitted to modify its proposal.

2.8 Closing Date for Submission of Proposals

Electronic proposals must be received at WHO at the address specified in section *2.6 Sealing and marking of proposals* no later than 15 February 2008, 12:00 hours, Central European Time. An identical hard copy of the proposal must be received at WHO at the address specified in section *2.6 Sealing and marking of proposals* within two weeks of electronic submission.

WHO may, at its own discretion, extend this closing date for the submission of proposals by amending the RFP in accordance with clause Amendments of RFP at any time up to and after the closing date, in which case all rights and obligations of WHO and bidders previously subject to the closing date will thereafter be subject to the closing date as extended.

Any proposal received by WHO after the closing date for submission of proposals, pursuant to closing date for the submission of proposals, may be rejected. WHO reserves the right to review proposals submitted after the closing date if it deems this to be in its best interest.

2.9 Modification and Withdrawal of Proposals

The bidder may withdraw its proposal anytime after the proposal's submission and before the opening date, provided that written notice via email and fax of the withdrawal is received by WHO prior to the closing date prescribed for submission of proposals.

The bidder's withdrawal notice shall be prepared, sealed, marked, and dispatched to be received before the closing date in accordance with section *2.8 Closing date for submission of proposals*. The withdrawal notice may also be sent by email but must be followed by a signed confirmation copy received by the closing date.

Email for withdrawal of proposal: gdwq@who.int

No proposal may be modified after the closing date for submission of proposals, unless WHO has issued an amendment to the RFP allowing such modifications (see section *2.10 Amendments of the RFP*).

No Proposal may be withdrawn in the interval between the opening date and the expiration of the period of proposal validity specified by the bidder in the proposal.

2.10 Amendments of the RFP

At any time prior to the closing date for submission of proposals, WHO may, for any reason, whether on its own initiative or in response to a clarification requested by a prospective bidder, modify the RFP by amendment. Amendments could include modification of project scope or requirements, project timeline expectations or extension of the closing date for submission.

All prospective bidders that have received the RFP will be notified in writing of all amendments to the RFP. Bidders are not required to modify their Proposal in the event of an amendment.

3. EVALUATION OF PROPOSALS

3.1 Clarification of Proposals

WHO may, at its discretion, ask any bidder for clarification of any part of its proposal to assist in the examination, evaluation and comparison of proposals. The request for clarification and the response shall be in writing. No change in price or substance of the proposal shall be sought, offered or permitted during this exchange.

3.2 Preliminary Examination of Proposals

WHO will examine the proposals to determine whether they are complete, whether any computational errors have been made, whether the documents have been properly signed, and whether the proposals are generally in order.

Please note that WHO is not bound to select any of the individuals/institutions submitting proposals. Furthermore, since a contract would be awarded in respect of the proposal which is considered most responsive to the needs of the project concerned, due consideration being given to WHO's general principles, including economy and efficiency, WHO does not bind itself in any way to select the individuals/institution offering the lowest price.

3.3 Technical Evaluation of Proposals

Criteria taken into account will include excellence and value for money. Selection will take account of competence as evidenced by familiarity with the subject matter work; demonstrated delivery capacity (and deliverables of the type required); and cost.

Review criteria include, but are not limited to:

(i) demonstrated capacity to deliver work in either HWT or IAQ interventions or both
(ii) innovative and well thought-out approaches to integrating interventions, and
(iii) existing organizational structure in a given community/country that can ensure larger-scale implementation of integrated approaches (if deemed successful).

The proposals will be reviewed by a panel of WHO Headquarters and Regional Office staff and selected external experts. Every bidder will be notified in due course of the outcome of the evaluation.

3.4 Bidders' Presentations

At the discretion of WHO, selected bidders may be invited to supply additional information on the contents of their proposal during the evaluation period. Such bidders will be asked to give a presentation of their proposal (possibly with an emphasis on a topic of WHO's choice) followed by a question and answer session. The presentation will be held at WHO Headquarters, Switzerland or by videoconference/Internet.

NOTE: Presentations or other individual contact is expressly prohibited before the closing date for proposal submission.

4. AWARD OF CONTRACT

4.1 Award Criteria, Award of Contract

WHO reserves the right to accept or reject any proposal, and to annul the solicitation process and reject all proposals at any time prior to award of contract, without thereby incurring any liability to the affected bidder or any obligation to inform the affected bidder or bidders of the grounds for the WHO's action.

Prior to expiration of the period of proposal validity, WHO will award the contract to the qualified bidder or bidders whose proposal, after being evaluated, is considered to be the most responsive to the needs of the Organization and activity concerned.

WHO has the right to eliminate bids for technical reasons throughout the evaluation process. However, WHO is under no obligation to state the reasons for elimination to the bidder.

NOTE: WHO is **acting in good faith** by issuing this RFP. However, **this document does not obligate WHO to contract for the supply of any products or services.**

4.2 WHO's Right to modify Scope or Requirements during the Proposal Process

WHO reserves the right to, at any time during the proposal process, modify the scope of services and goods specified in the RFP. At any step in the evaluation process, WHO reserves the right to issue an amendment to the RFP detailing the change to only those bidders who have not been officially eliminated due to technical reasons at that point in time. Official elimination is signified by a direct communication to that effect from WHO.

4.3 WHO's Right to Extend/Revise Scope or Requirements at Time of Award

WHO reserves the right at the time of award of contract to extend/revise the scope of services and goods specified in the RFP without any change in base price of services (e.g. day rate for resources) or other terms and conditions.

4.4 WHO's Right to enter into Contract Price Negotiations

WHO reserves the right to enter into contract price negotiations with one or more bidders that have not been eliminated during the evaluation process.

4.5 Signing of the Contract

Within 30 days of receipt of the contract the successful bidder shall sign and date the contract and return it to WHO according to the instructions provided at that time. If the bidder does not accept the contract terms without changes, then WHO has the right not to proceed with the selected bidder and instead contract with another bidder of its choice.

5. GENERAL AND CONTRACTUAL CONDITIONS

The general terms and conditions of the contractual agreement ("the Contract") between WHO and the selected bidder ("the Contractor") will cover the following issues:

- responsibilities, indemnities and liabilities of the supplier(s) and WHO;
- conditions concerning the termination of the contract(s);
- clear deliverables and acceptance procedures;
- payment terms tied to the satisfactory completion of the work;
- allowance for changes;
- warranties and representations;
- notices.

The general terms and conditions of the Contract are set fort in Annex 2 and form an integral part of this RFP.

Services under this Contract will be supplied on a fixed-price basis in a UN convertible currency (preferably US Dollars), based on the UN exchange rate of the date of invoice.

ANNEXES

Annex 1: Declaration of Interests for WHO Experts

The assistance of distinguished authorities knowledgeable in a variety of medical and scientific professions is essential to the solution of international health issues. **It is expected that persons qualified to serve as an expert for the World Health Organization (WHO) may have private interests related to the subject of their expertise. At the same time, it is imperative that situations be avoided in which such interests may unduly affect, or may be perceived to affect, an expert's impartiality or the outcome of work in which he/she was involved.**

To assure the highest integrity, and hence public confidence, in the activities of the Organization, WHO regulations and policies require that all experts serving in an advisory role disclose any circumstances which could give rise to a **potential conflict of interest** (i.e., any interest which may affect, or may reasonably be perceived to affect, the expert's objectivity and independence). Accordingly, in this Declaration of Interest form, you are requested to disclose any financial, professional or other interest relevant to the subject of the work or meeting in which you will be involved and any interest that could be significantly affected by the outcome of the meeting or work. You are also asked to declare relevant interests of others who may, or may be perceived to, unduly influence your judgment, such as immediate family members, employers, close professional associates or any others with whom you have a substantial common personal, financial or professional interest.

Kindly complete this form and submit it to WHO Secretariat, well in advance of the meeting or work. You are also asked to inform the Secretariat of any change in this information that occurs before or during the course of the meeting or work. If WHO considers that a potential conflict of interest exists, one of several outcomes can occur, depending on the circumstances involved: (i) you may be invited to continue to participate in the meeting or work, provided that your interest would be publicly disclosed; (ii) you may be asked not to take part in the portion of the meeting, discussion or work related to your interest, or not participate in related decisions; or (iii) you may be asked not to take part in the meeting or work altogether. Non-completion of the DOI form would preclude further consideration of an expert's participation.

Experts are requested to agree that any relevant conflicts may be **publicly disclosed** to other meeting participants and in the resulting report or other work product. The Secretariat will assume that you consent to such a disclosure, unless you check "no" in the space provided on the last page of this form. The information disclosed by you **may later be made available** to persons outside of WHO if the objectivity of the work or meeting in which you are involved is questioned and the Director-General considers disclosure to be in the best interests of the Organization, although only after discussion with you.

Name: Institution: Email:

Date and title of meeting or work, including description of subject-matter to be considered (if a number of substances or processes are to be evaluated, a list should be attached):

_____

_____

Please answer each of the questions below. If the answer to any of the questions is "yes", briefly describe the circumstances on the last page of the form.

The term "you" refers to yourself, your employer and your immediate family members (i.e., spouse (or partner with whom you have a similar close personal relationship) and your minor children). "Commercial entity" includes -- aside from any commercial business -- an industry association, research institution or other enterprise whose funding is significantly derived from

commercial sources having an interest related to the subject of the meeting or work. "Organization" includes a governmental, international or non-profit organization. "Meeting" includes a series or cycle of meetings.

EMPLOYMENT AND CONSULTING

Within the past 3 years, have you received remuneration from a commercial entity or other organization with an interest related to the subject of the meeting or work? Please also report any application or negotiation for future work.

1a Employment Yes ☐ No ☐

1b Consulting, including service as a technical or other advisor Yes ☐ No ☐

RESEARCH SUPPORT

Within the past 3 years, have you or your department or research unit received support or funding from a commercial entity or other organization with an interest related to the subject of the meeting or work? Please also report any application or award for future research support.

2a Research support, including grants, collaborations, sponsorships, and other funding Yes ☐ No ☐

2b Non-monetary support valued at more than US$1000 overall (include equipment, facilities, research assistants, paid travel to meetings, etc.) Yes ☐ No ☐

INVESTMENT INTERESTS

Do you have current investments (valued at more than US$10 000 overall) in a commercial entity with an interest related to the subject of the meeting or work? Please also include indirect investments such as a trust or holding company. You may exclude mutual funds, pension funds or similar investments that are broadly diversified.

3a Stocks, bonds, stock options, other securities (e.g., short sales) Yes ☐ No ☐

3b Commercial business interests (e.g., proprietorships, partnerships, joint ventures) Yes ☐ No ☐

INTELLECTUAL PROPERTY

Do you have any current intellectual property rights that might be enhanced or diminished by the outcome of the meeting or work?

4a Patents, trademarks, or copyrights (also include pending applications) Yes ☐ No ☐

4b Proprietary know-how in a substance, technology or process Yes ☐ No ☐

PUBLIC STATEMENTS AND POSITIONS **(during the past 3 years)**

5a As part of a regulatory, legislative or judicial process, have you provided an expert opinion or testimony, related to the subject of the meeting or work, for a commercial entity or other organization? Yes ☐ No ☐

5b Have you held an office or other position, paid or unpaid, where you may be expected to represent interests or defend a position related to the subject of the meeting or work? Yes ☐ No ☐

ADDITIONAL INFORMATION

6a **If not already disclosed above, have you worked for the competitor of a product which is the subject of the meeting or work, or will your participation in the meeting or work enable you to obtain access to a competitor's confidential proprietary information, or create for you a financial or commercial competitive advantage?** Yes ☐ No ☐

6b To your knowledge, would the outcome of the meeting or work benefit or adversely affect interests of others with whom you have substantial common personal, financial or professional interests (such as your adult children or siblings, close professional colleagues, administrative unit or department)? Yes ☐ No ☐

6c Is there any other aspect of your background or present circumstances not addressed above that might be perceived as affecting your objectivity or independence? Yes ☐ No ☐

7. TOBACCO OR TOBACCO PRODUCTS ***(answer without regard to relevancy to the subject of the meeting or work)***

Within the past 3 years, have you had employment or received research support or other funding from the tobacco industry or had any other professional relationship Yes ☐ No ☐

with an entity, directly involved in the production, manufacture, distribution or sale of tobacco or tobacco products or representing the interests of any such entity?

EXPLANATION OF "YES" RESPONSES: If the answer to any of the above questions is "yes", check above and briefly describe the circumstances on this page. If you do not provide, the amount or value of the interest, where requested, it will be assumed to be significant.

Nos. 1 - 4: 7 **Type of interest, question number and category (e.g., Intellectual Property 4.a copyrights) and basic descriptive details.**	**Name of company, organization, or institution**	**Belongs to you, a family member, employer, research unit or other?**	**Amount of income or value of interest (if not disclosed, is assumed to be significant)**	**Current interest (or year ceased)**
Nos. 5-6: Describe the subject, specific circumstances, parties involved, time frame and other relevant details				

CONSENT TO DISCLOSURE. The Secretariat will assume that you consent to the disclosure of any relevant conflicts to other meeting participants and in the resulting report or work product, unless you check "no" in the space provided here. If you check "no", the Secretariat will not disclose the information without your prior approval, although this may result in your not being able to participate in the meeting or conference. **No:** □

DECLARATION. I hereby declare on my honour that the disclosed information is true and complete to the best of my knowledge.

Should there be any change to the above information due to the fact that I acquire additional interests, I will notify the responsible staff of WHO and complete a new declaration of interests detailing the changes. This includes any change which occurs before or during the meeting or work itself and through the period up to the publication of the final results.

Date: _____ Signature_____

Annex 2: General and Contractual Conditions

The general terms and conditions of the contractual agreement ("the Contract") between WHO and the selected bidder ("the Contractor") will include provisions as set forth in this section, and will cover the following issues:

- responsibilities, indemnities and liabilities of the supplier(s) and WHO;
- conditions concerning the termination of the contract(s);
- clear deliverables and acceptance procedures;
- payment terms tied to the satisfactory completion of the work;
- allowance for changes;
- warranties and representations;
- notices.

Services under this Contract will be supplied on a fixed-price basis in a UN convertible currency (preferably US Dollars), based on the UN exchange rate of the date of invoice.

Annex 2.1 Responsibility

The Contractor will be responsible to ensure that the services rendered under the Contract are in accordance with the specifications and within the time prescribed.

Annex 2.2 Source of Instructions

The Contractor shall neither seek nor accept instructions from any authority external to WHO in connection with the performance of its services under this Contract. The Contractor shall refrain from any action which may adversely affect WHO and shall fulfil its commitments with the fullest regard to the interests of WHO.

Annex 2.3 Warranties

The Contractor will warrant and represent to WHO as follows:

1) The deliverable shall meet the specifications and shall function in a manner which is fully adequate to meet its intended purpose. The Contractor furthermore warrants that the deliverable shall be error-free, in that the Contractor shall correct any errors in the deliverable, free of charge, within fifteen days after their notification to the Contractor, during a period of at least six months. It is agreed, however, that errors and other defects, which have been caused by modifications to the deliverable made by WHO without agreement of the Contractor are not covered by this paragraph.

2) The deliverable shall, to the extent it is not original, only be derived from, or incorporate, material over which the Contractor has the full legal right and authority to use it for the proper implementation of this Contract. The Contractor shall obtain all the necessary licenses for all non-original material incorporated in the deliverable including, but not limited to, licenses for WHO to use any underlying software, application, and operating deliverables included in the deliverable or on which it is based, so as to permit WHO to fully exercise its rights in the deliverables and the software without any obligation on WHO's part to make any additional payments whatsoever to any party.

3) The deliverable shall not violate any copyright, patent right, or other proprietary right of any third party and be delivered to WHO free and clear of any and all liens, claims, charges, security interest and any other encumbrances of any nature whatsoever.

4) The Contractor, its employees and any other persons and entities used by the Contractor shall furthermore not copy and/or otherwise infringe on the copyright of any document (whether machine readable or not) to which the Contractor, its employees and any other persons and entities used by the Contractor have access in the performance of this Contract.

5) Except as otherwise explicitly provided in the Contract, the Contractor shall at all times provide all the

necessary on-site and off-site resources to meet its obligations hereunder. The Contractor shall only use highly qualified staff, acceptable to WHO, to perform its obligations hereunder.

6) The Contractor shall take full and sole responsibility for the payment of all wages, benefits and monies due to all persons and entities used by it in connection with the implementation and execution of their Contract, including, but not limited to, the Contractor's employees, permitted subcontractors and suppliers.

Annex 2.4 Legal Status

The Contractor shall be considered as having the legal status of an independent contractor and as such there will be no employer/employee relationship between WHO on the one side and the Contractor or any person used by the Contractor on the other side.

Thus the Contractor shall be solely responsible for the manner in which the work is carried out. WHO shall not be responsible for any loss, accident, damage or injury, including, but not limited to, damage to test equipment, spare parts and other property, suffered by the Contractor or persons or entities claiming under the Contractor, arising during or as a result of the implementation or execution of the Contract, including travel, whether sustained on WHO premises or not.

The Contractor shall obtain adequate insurance to cover such loss, accident, injury and damages, before commencing work on the Contract. The Contractor shall be solely responsible in this regard and shall handle any claims for such loss, accident, damage or injury.

Nothing in or relating to the agreement with the Contractor shall be deemed a waiver of any of the privileges and immunities of WHO in conformity with the Convention on the Privileges and Immunities of the Specialized Agencies approved by the General Assembly of the United Nations on November 21, 1947 or otherwise under any national or international law, convention or agreement.

Annex 2.5 Relations Between the Parties

The Contract does not constitute a partnership between the Parties or to constitute either Party as the agent of the other.

Annex 2.6 Waiver of Breach

The waiver by an act, omission or knowledge of either Party, its agents or its employees of any provision or breach of the contract shall not prevent subsequent enforcement of such provision or excuse further breaches.

Annex 2.7 Liability

The Contractor hereby indemnifies and holds WHO harmless from and against the full amount of any and all claims and liabilities, including legal fees and costs, which are or may be made, filed or assessed against WHO at any time and based on, or arising out of, breach by the Contractor of any of its representations or warranties under the Contract, regardless of whether such representations and warranties are explicitly incorporated here in or are referred to in any attached Appendices.

Annex 2.8 Assignment

The Contractor shall not assign, transfer, pledge or make other disposition of this Contract or any part thereof, or any of the Contractor's rights, claims or obligations under this Contract except with the prior written consent of WHO.

Annex 2.9 Officials not to Benefit

The Contractor warrants that no official of WHO has received or will be offered by the Contractor any direct or indirect benefit arising from this Contract or the award thereof. The Contractor agrees that breach of this provision is a breach of an essential term of this Contract. The Contractor also warrants that it is not and will not be involved in, or associated with, any other entity involved in terrorism.

Annex 2.10 Indemnification

The Contractor shall indemnify, hold and save harmless, and defend, at its own expense, WHO, its officials, agents, servants and employees from and against all suits, claims, demands, and liability of any nature or kind, including their costs and expenses, arising out of acts or omissions of the Contractor, or the Contractor's employees, officers, agents or sub-contractors, in the performance of the Contract. This provision shall extend, *inter alia*, to claims and liability in the nature of workmen's compensation, products liability and liability arising out of the use of patented inventions or devices, copyrighted material or other intellectual property by the Contractor, its employees, officers, agents, servants or sub-contractors. The obligations under this Article do not lapse upon termination of this Contract.

Annex 2.11 Contractor's Responsibility for Employees

The Contractor shall be responsible for the professional and technical competence of its employees and will select, for work under the Contract, reliable individuals who will perform effectively in the implementation of the Contract, respect the local customs, and conform to a high standard of moral and ethical conduct.

Annex 2.12 Subcontracting

Any intention to subcontract aspects of this contract must be specified in detail in the tender submitted. Information concerning the subcontractor, including the qualifications of the staff proposed for use must be covered with same thoroughness as the prime contractor. No subcontracting will be permitted under this Contract unless it is proposed in the initial submission or formally agreed to by WHO at a later time. In any event, the total responsibility for the Contract rests with the prime contractor.

Annex 2.13 Language

The internals of the work performed for this project and management and contractual communications for this project will be executed in English.

Annex 2.14 Confidentiality

1) Except as explicitly provided in the Contract, the Contractor shall keep confidential all information marked "confidential" which comes to its knowledge during, or as a result of, the implementation and execution of the Contract. Accordingly, the Contractor shall not use or disclose such information for any purpose other than the performance of its obligations under the Contract. The Contractor shall ensure that each of its employees and/or other persons and entities having access to such information shall be made aware of, and be bound by, the obligations of the Contractor under this paragraph. However, there shall be no obligation of confidentiality or restriction on use, where: (i) the information is publicly available, or becomes publicly available, otherwise than by any action or omission of the Contractor, or (ii) the information was already known to the Contractor (as evidenced by its written records) prior to becoming known to the Contractor in the implementation and execution of this Contract; or (iii) the information was received by the Contractor from a third party not in breach of an obligation of confidentiality.
2) The Contractor, its employees and any other persons and entities used by the Contractor shall

furthermore not copy and/or otherwise infringe on copyright of any document (whether machine-readable or not) to which the Contractor, its employees and any other persons and entities used by the Contractor have access in the performance of this Contract.

Annex 2.15 Confidential Nature of Documents and Information

All maps, drawings, photographs, mosaics, plans, reports, recommendations, estimates, documents and all other data compiled by or received by the Contractor under this Contract shall be the property of WHO, shall be treated as confidential and shall be delivered only to WHO authorized officials on completion of work under this Contract.

The Contractor may not communicate at any time to any other person, Government or authority external to WHO, any information known to it by reason of its association with WHO which has not been made public except with the authorization of WHO; nor shall the Contractor at any time use such information to private advantage. These obligations do not lapse upon termination of this Contract.

Annex 2.16 Title Rights

1) This is a work made for hire. WHO shall be the owner of all intellectual property rights, including but not limited to patents, copyrights and trademarks, with regard to material which bears a direct relation to, or is made in consequence of, the services provided to the Organization by the Contractor.

2) WHO reserves the right to revise the work, to use the work in a different way from that originally envisaged or to not use the work at all.

3) At the WHO's request, the Contractor shall take all necessary steps, execute all necessary documents and generally assist in securing such proprietary rights and transferring them to WHO in compliance with the requirements of the applicable law.

Annex 2.17 Cancellation

WHO shall have the right to cancel the Contract (in addition to other rights, such as the right to claim damages):

1) At will with the provision of thirty (30) days prior notice in writing;

2) In the event the Contractor fails to begin work on the date agreed, or to implement the work in accordance with the terms of the Contract; or

3) In the event the progress of work is such that it becomes obvious that the obligations undertaken by the Contractor and, in particular, the time of fulfilment, will not be respected.

4) In addition, WHO shall be entitled to terminate the Contract (or part thereof), in writing, with immediate effect (in addition to other rights, such as the right to claim damages), if, other than as provided in the paragraph above, the Contractor is:

    a. In breach of any of his material obligations under the Contract and fails to correct such breach within a period of thirty (30) days after having received a written notification to that effect from WHO;

    b. Adjudicated bankrupt or formally seeks relief of his financial obligations.

Annex 2.18 Force Majeure

No party to the Contract shall be responsible for a delay caused by force majeure, that is, a delay caused by strike, lock-out, foreign or civil war, or any other event outside his control, it being agreed, however, that WHO shall be entitled to terminate the Contract (or any part of the Contract) forthwith if the implementation of the work is delayed or prevented by any such reason for an aggregate of thirty (30) days. Such termination shall be subject to payment of an equitable part of the Contract sum and/or other reasonable charges. In the event of such termination, the Contractor shall, in accordance with the ownership rights referred to in *Annex 2.16 Title rights*, deliver to WHO all work products and other materials so far produced.

a) Force majeure, as used in this Article, means acts of God, war (whether declared or not), invasion, revolution, insurrection, or other acts of a similar nature or force which are beyond the control of the Parties.

b) In the event of and as soon as possible after the occurrence of any cause constituting force majeure, the Contractor shall give notice and full particulars in writing to WHO, of such occurrence or change if the Contractor is thereby rendered unable, wholly or in part, to perform its obligations and meet its responsibilities under this Contract. The Contractor shall also notify WHO of any other changes in conditions or the occurrence of any event which interferes or threatens to interfere with its performance of this Contract. The notice shall include steps proposed by the Contractor to be taken including any reasonable alternative means for performance that is not prevented by force majeure. On receipt of the notice required under this Article, WHO shall take such action as, in its sole discretion, it considers to be appropriate or necessary in the circumstances, including the granting to the Contractor of a reasonable extension of time in which to perform its obligations under this Contract.

c) If the Contractor is rendered permanently unable, wholly, or in part, by reason of force majeure to perform its obligations and meet its responsibilities under this Contract, WHO shall have the right to suspend or terminate this Contract on the same terms and conditions as are provided for in *Annex 2.17 Cancellation*, except that the period of notice shall be seven (7) days instead of thirty (30) days.

Annex 2.19 Advertising

Without WHO's prior written approval, the Contractor shall not, in any statement of an advertising or promotional nature, refer to the Contract or his relationship with WHO. In no case shall the Contractor use the name or the emblem of the World Health Organization, or any abbreviation thereof, in relation to its business or otherwise.

Annex 2.20 Successors and Assignees

The Contract shall be binding upon the successors and assignees of the Contractor and the Contract shall be deemed to include the Contractor's successors and assignees, provided, however, that nothing in the Contract shall permit any assignment without the prior and written approval of WHO.

Annex 2.21 Payment

Payment will be made against presentation of an invoice in the currency quoted in its bid for each deliverable and subject to WHO's acceptance of each such deliverable. Any payments by WHO to the Contractor shall reflect any tax exemptions to which WHO is entitled by reason of the immunity it enjoys. WHO is exempt from all direct taxes, customs duties and the like and the Contractor shall consult with WHO so as to avoid the imposition of such charges. As regards duties and other indirect taxes, the Contractor shall list such charges on invoices as a separate item and, to the extent required, cooperate with WHO to enable reimbursement thereof.

Annex 2.22 Insurance and Liabilities to Third Parties

The Contractor shall provide and thereafter maintain insurance against all risks in respect of its property and any equipment used for the execution of this Contract.

The Contractor shall provide and thereafter maintain all appropriate workmen's compensation insurance, or its equivalent, with respect to its employees to cover claims for personal injury or death in connection with this Contract.

The Contractor shall also provide and thereafter maintain liability insurance in an adequate amount to cover third party claims for death or bodily injury, or loss of or damage to property, arising from or in connection with the provision of services under this Contract or the operation of any vehicles, boats, airplanes or other equipment owned or leased by the Contractor or its agents, servants, employees or sub-contractors performing work or services in connection with this Contract. Except for the workmen's compensation insurance, the insurance policies under this Article shall:

a) Include a waiver of subrogation of the Contractor's rights to the insurance carrier against WHO;

b) Provide that WHO shall receive thirty (30) days written notice from the insurers prior to any cancellation or change of coverage.

The Contractor shall, upon request, provide WHO with satisfactory evidence of the insurance required under this Article.

Annex 2.23 Settlement of Disputes

Any dispute relating to the interpretation or application of the contract shall, unless amicably resolved, be subject to conciliation. In the event of failure of the latter, the dispute shall be settled by arbitration. The arbitration shall be conducted in accordance with the modalities to be agreed upon by the parties or, in the absences of agreement, with the rules of arbitration of the International Chamber of Commerce. The parties shall accept the arbitral award as final.

Annex 2.24 Observance of the Law

The Contractor shall comply with all laws, ordinances, rules, and regulations bearing upon the performance of its obligations under the terms of this Contract.

Annex 2.25 Authority to Modify

No modification or change in this Contract, no waiver of any of its provisions or any additional contractual relationship of any kind with the Contractor shall be valid and enforceable against WHO unless provided by an amendment to this Contract signed by the authorized official of WHO.

Annex 2.26 Privileges and Immunities

Nothing in or relating to this Contract shall be deemed a waiver of any of the privileges and immunities of WHO in conformity with the Convention on the Privileges and Immunities of the Specialized Agencies approved by the General Assembly of the United Nations on November 21, 1947 or otherwise under any national or international law, convention or agreement.

Exploring the Potential Synergies of Household-based Interventions to Improve Drinking Water Quality and Indoor Air Quality: a Concept Note

Prepared for the World Health Organization by

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Annex 3.1 Executive Summary

It is estimated that 1.2 billion people globally lack access to improved water supplies and 3.2 billion people rely on biomass fuels and coal to provide their domestic energy requirements. The associated environmental health hazards of poor water quality and poor indoor air quality are major contributors to the millions of annual deaths resulting from diarrhoeal disease and acute and chronic respiratory disease. The majority of these deaths occur among children and women from poor households.

Household water treatment (HWT) and interventions to improve indoor air quality (IAQ) offer effective means to address these health hazards. If implemented at scale, these interventions could make significant contributions to the achievement of the Millennium Development Goals by reducing child mortality, improving maternal health, reducing poverty and improving environmental sustainability. However, to date HWT interventions have reached only around 0.1% of those without access to improved water supplies and IAQ projects or programmes that reach more than 100,000 households are rare.

Both HWT and IAQ interventions take effect at household level, and require action by householders to implement them. The target groups for these interventions are likely to overlap frequently and the challenge of achieving sustainability at scale is common to both. The biggest health impact for these interventions would be realized by children and the greatest health gains for children would be achieved by protecting them simultaneously from the hazards of poor water quality and poor IAQ. For these reasons there is interest in the possibility of integrating HWT and IAQ interventions and there are examples of projects that have done so including those by the World Bank in Bangladesh, by Enterprise Works in Ghana and by GTZ–PAHO in Peru.

The integration of HWT and IAQ interventions offers potential synergies and antagonisms. These will depend on the technologies and intervention methods used and the cultural, social and economic context. Some of the main potential synergies include the sharing of production techniques, consumer insights, marketing and distribution networks, improving sustainability through increasing business opportunities and using micro-finance initiatives to overcome shared financial barriers to consumer access. Potential antagonisms include competition for the attention and financial resources of households and the chance of sub-optimal technology choices to allow ease of integration.

Suggested models for integrating HWT and IAQ interventions include (i) adding one as a component to a successful, ongoing intervention for the other, (ii) using existing structures from a previous HWT/IAQ intervention to facilitate a subsequent intervention for the other, (iii) developing a micro-finance scheme to allow access to either a package or a menu of household environmental health interventions and (iv) developing a promotional campaign and publicly funded voucher scheme to encourage purchase of cooking and water treatment technologies.

It is proposed that WHO initiate a Request for Proposals (RFP) and fund two to four pilot projects. The objective of the RFP process is to arrive at the most promising projects, however, the process will generate new ideas that may be combined to take advantage of the best features of different proposals. In judging the proposals particular attention should be given to the criteria and methods proposed for evaluation so as to maximize the opportunity to document and disseminate the lessons learned.

Annex 3.2 Purpose

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

Annex 3.3 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 five years (Clasen et al. 2006). 3.2 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 five years 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 effective alternatives to boiling their drinking water (or simply to pasteurize the water at about 70°) 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 can offer income-generating opportunities for local entrepreneurs and their employees.

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), microbiological quality ceramic filtration and solar disinfection have collectively yielded about 12 million regular users, or about 0.1% of those without access to improved water supplies (Clasen 2007). Boiling is widely practiced in certain Asian countries, but without safe storage it leaves water subject to contamination. Furthermore, boiling using coal and biomass fuels 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 (POUZN Project 2007) 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.

Annex 3.4 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 as well as 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 realized 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 the health promotion literature. Their prominence arises from two lines of thinking. First, on a practical level a setting such as a school or 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. Secondly, there is a growing recognition that characteristics of settings in which

people interact can constrain or facilitate particular behaviours with consequences for health. Within health promotion the idea developed that while health systems can combat disease the creation of 'health' requires 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. The following section summarizes a number of potential synergies and antagonisms.

Annex 3.5 Potential for Synergy

The motivation for integrating two or more household environmental health interventions (such as HWT and IAQ) is the prospect that a combined intervention could achieve more per unit of input than two interventions run separately. The intervention process may offer opportunities for synergy but also create 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.

Annex 3.5.1 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. health, water, energy, environment). 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 and environmental health action plans in Europe.

Annex 3.5.2 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 undertaken. Much of this information is not specific to particular interventions and that which is (e.g. the types 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 measurement techniques and access to specific equipment.

Annex 3.5.3 Technology development

A single technology that addresses 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 addresses a single problem) it might allow synergies at later points since supply chains and promotion are concerned with one product. There may, however, be problems and disadvantages associated with combined technology development since the technical expertise for different technologies is likely to lie with different groups of people. As a result, a technology designed to address two aims may be a compromise that addresses neither endpoint as effectively as a more specialized technology.

Annex 3.5.4 Technology production

Synergies can arise 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). Assuming overall production increases, this will not necessarily reduce the numbers of people to be trained or employed.

Annex 3.5.5 Technology sale

The production and/or sale of more than one technology offer businesses opportunities to diversify, which might help to ensure short-term and long-term 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.

Annex 3.5.6 Health outcome

An intervention to address one environmental health outcome might have knock-on effects for another outcome. For example, promoting an effective 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 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.

Annex 3.5.7 Behaviour change and technology promotion

Communication for behaviour change requires developing and delivering a message. Message development requires identifying target audiences, understanding their current practice, recognizing the constraints to change and being aware of 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 such insights 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 mobilization approach is used the structures put in place or utilized for promotion of one technology or behaviour might subsequently be employed in the promotion of another. Delivering a message requires identifying effective 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. As the female head of the household often bears responsibility for water and cooking, there may be synergies in directing messages concerning these interventions to her and to communication channels shown to be effective in reaching her.

It may be that a brand successfully developed for one intervention 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, for example, financial services in the company's portfolio has helped it to sell more music is debateable.

Annex 3.5.8 Technology distribution/supply chain

There may be potential for synergy in the use of distribution networks and outlets. In part, this is determined by the technologies being promoted, depending on whether they are produced locally or, for certain critical components, centrally. In addition, factors like size, robustness and cost and speed of turnover have implications 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.

Annex 3.5.9 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 could synergistically facilitate access to another. The potential for antagonism also exists since the two technologies may compete for the same limited pot of household money.

Annex 3.5.10 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 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 as well as 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.

Annex 3.5.11 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. On the other hand, 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.

Annex 3.5.12 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*.

Annex 3.6 Establishing Priorities and Project Criteria

The foregoing summarises some of the potential synergies between household-based interventions to improve drinking water quality and reduce indoor air pollution. 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.

Annex 3.6.1 Policy priorities

As noted in section 2, 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 today. 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 reductions in greenhouse gas emissions, 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.

Annex 3.6.2 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 not be difficult 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. In order to optimize health gains, the strategy might be specifically targeted at providing a more healthy environment for children.

Annex 3.6.3 Cost recovery and pricing

One factor that will determine whether a given strategy can reach the target population is whether the beneficiaries are 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, much like vaccines, the nets should be distributed to targeted populations free of charge to accelerate coverage. Others advocated for targeted subsidies 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 (e.g. 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.

Annex 3.6.4 Product compatibility

Among HWT options, the solution that has achieved the highest rates of coverage to date is also one that is the least "hardware" intensive and associated with very low cost: sodium hypochlorite (liquid bleach) sold in 150ml plastic bottles. Improved stoves, on the other hand, are relatively high in price and hardware, much like biosand or higher quality commercial ceramic 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.

Annex 3.6.5 Other potential synergies

The potential for combining interventions to improve drinking water and indoor air quality should not ignore opportunities to deliver other environmental interventions such as improved water supplies and sanitation.

Annex 3.7 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 utilize community mobilization structures put in place for sanitation promotion as the basis for an IAQ intervention. The interventions take place sequentially but the mobilization process is expected to be faster and more efficient when used for a second time (Rouse personal communication, 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 recognized 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 pasteurization 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 with respect to, for example, 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 emphasize 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, or use the structures established by this programme to promote a second intervention.
- Develop and implement a programme that is specifically designed to introduce the interventions consecutively in order to leverage resources and build on an emerging base.
- 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 require a comparatively small loan to borrowers with established reputations it may be attractive to finance institutions. This may depend on whether the product consists of more expensive, at times bulky, items such as many 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.

Annex 3.8 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 HWT and IAQ 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. Agencies might also be encouraged to address the issues raised above about settings, potential areas of synergy, and programme priorities. Beyond this, they should be free to use their best judgement about the nature and scope 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 IAQ 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 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 the population, document benefits other than the health of adopting householders, and show 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.

Annex 3.9 Further Reading

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.

Improved air quality

WHO (2007). Fuel for life: household energy and health. Geneva: WHO (available at http://www.who.int/indoorair/publications/fuelforlife/en/index.html) .

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

World Health Organization. Indoor air pollution
http://www.who.int/indoorair/en/

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

Partnership for Clean Indoor Air
http://www.pciaonline.org/index.cfm

Practical Action – formerly Intermediate Technology Development Group
http://practicalaction.org/

Annex 3.10 References

Clasen T (2007). Scaling up household water treatment: looking back, seeing forward. Geneva: World Health Organization (in press).

Clasen T, Roberts I, Rabie T, Schmidt W-P, Cairncross S (2006). Interventions to improve water quality for preventing diarrhoea (Cochrane Review). In: The Cochrane Library, Issue 3, 2006. Oxford: Update Software.

Harries AD, Hargreaves NJ, Chimzizi R, Salaniponi FM (2002). Highly active antiretroviral therapy and tuberculosis control in Africa: synergies and potential. Bulletin of the World Health Organization 80(6):469-70.

Islam MF, Johnson RB (2006). Household pasteurization of drinking-water: the chulli water-treatment system. Journal of Health and Population Nutrition 24(3):356-62.

POUZN Project (2007). Best practices in social marketing of safe water solutions for household water treatment: lessons learned from Population Services International field programs. The Social Marketing Plus for Diarrhoeal Disease Control: Point-of-Use Water Disinfection and Zinc Treatment (POUZN) Project. Bethesda, MD: Abt Associates Inc.

Rehfuess E, Mehta S, Pruss-Ustun A (2006). Assessing household solid fuel use: multiple implications for the Millennium Development Goals. Environmental Health Perspectives 114(3):373-78.

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. Social Science and Medicine 61(9):1958-70.