

# **Barriers to Providing Safe Drinking Water Through Small Systems**

## **Workshop Report**

*Presented by*

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National Water Research Institute

*In cooperation with*  
Pan American Health Organization  
*and the*  
NSF International/WHO Collaborative Center

Pan American Health Organization Headquarters  
Washington, DC

May 13-15, 1998

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## FOREWORD

The concept for this workshop originated in 1997 during the early stages of planning for the 1st International Symposium on Safe Drinking Water in Small Systems. The National Water Research Institute (NWRI), in cooperation with the National Sanitation Foundation International (NSFI) and the Pan American Health Organization (PAHO), agreed to organize a Nominal Group Technique (NGT) workshop and to invite an international group of experts in small drinking water systems to participate. The dates for the workshop, May 13-15, 1998, were established so that many of the invitees could combine this event with their attendance at either the symposium or the World Bank conference on small drinking water systems, which preceded the workshop.

The NGT workshop is an intensive experience and provides a rich and robust opportunity for participants to explore and discuss common issues. The purpose of the workshop was to address the question *What are the most significant barriers (technical, economic, and political) to providing safe drinking water through small systems?*

Thirty-one participants representing the 17 countries of Barbados, Bolivia, Columbia, Costa Rica, Cuba, Dominican Republic, Ecuador, El Salvador, Jamaica, Nicaragua, Peru, South Africa, Surinam, Trinidad and Tobago, United Kingdom, United States, and Uruguay were actively engaged in the NGT process during the two-day workshop. A complete list of participants is found in Appendix B.

Part I of this document describes a preliminary action plan created by ten Working Groups to which the participants were assigned based on their contribution to a particular barrier identified during the NGT portion of the workshop. Each group prepared a report of the results of their deliberations regarding the refinement of text derived from the barrier identification phase. The reports were presented orally to the workshop participants at the end of the working group phase.

Part II of this document reports the results of the consensus-building process, which culminated in consolidating the 80 identified barriers into ten high-priority barriers. The Barrier Identification process included describing the importance of the barrier and a suggested approach to eliminating the barrier. The fact that the participants were able to identify 80 barriers demonstrated the significance of the concerns from their individual perspectives with respect to providing safe drinking water through small systems.

This document reports the results of the creative efforts of all those who participated in the two-day event. Extraordinary effort was exerted to maintain the integrity of both the original Spanish and English text in the translation process. The additional effort resulted in a significant delay in publishing this report within the normal time frame.

I would like to extend my sincere appreciation to the workshop co-sponsors, Mr. Horst Otterstetter, Director, and Mr. Raymond Reid, Regional Advisor, Division of Health and Environment, PAHO, for providing the workshop venue and additional staff support. And to Joseph Cotruvo, Ph.D., Director, NSF International/WHO Collaborating Center for his encouragement to plan and present the workshop.

Most of all, I would like to thank my colleague, William S. Gaither, Ph.D., whose expertise and unusual talent as a facilitator has enabled NWRI to present 12 NGT workshops throughout the world.

The level of excellence of the participants' contributions and interactions primarily determines the measure of success of an NGT workshop. This particular workshop can unequivocally be termed a success.

Such success, however, can only be achieved with the support provided by the professional staff. Special thanks are therefore extended to Patricia Linsky, Editor; Ofelia Nieto, Spanish Editor; Lucy Segura, Coordinator Word Processing; Lorenz Chan, Word Processor/Translator; Saúl Salmeron, Word Processor/Translator; Joanne Fleming, Word Processor; María Kegel, Consuelo Tonato, and Patricia De Los Rios, Spanish Translators (PAHO); Joe Pezely, Graphics Coordinator; Yolanda Virgil, Spanish graphics, and Xavier Saavedra, Graphic Assistant.

A special note of recognition is extended to Alberto Pombo and Derek Furukawa who, working closely with the Editor, were able to maintain the integrity of the original Spanish and English text while integrating it with the translations produced from the machine translation provided by PAHO.

A sincere appreciation is also extended to the participants, many of whom traveled considerable distances to participate in the workshop.

Ronald B. Linsky  
*Executive Director*  
*National Water Research Institute*  
*Workshop Secretary*

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## PARTICIPANTS



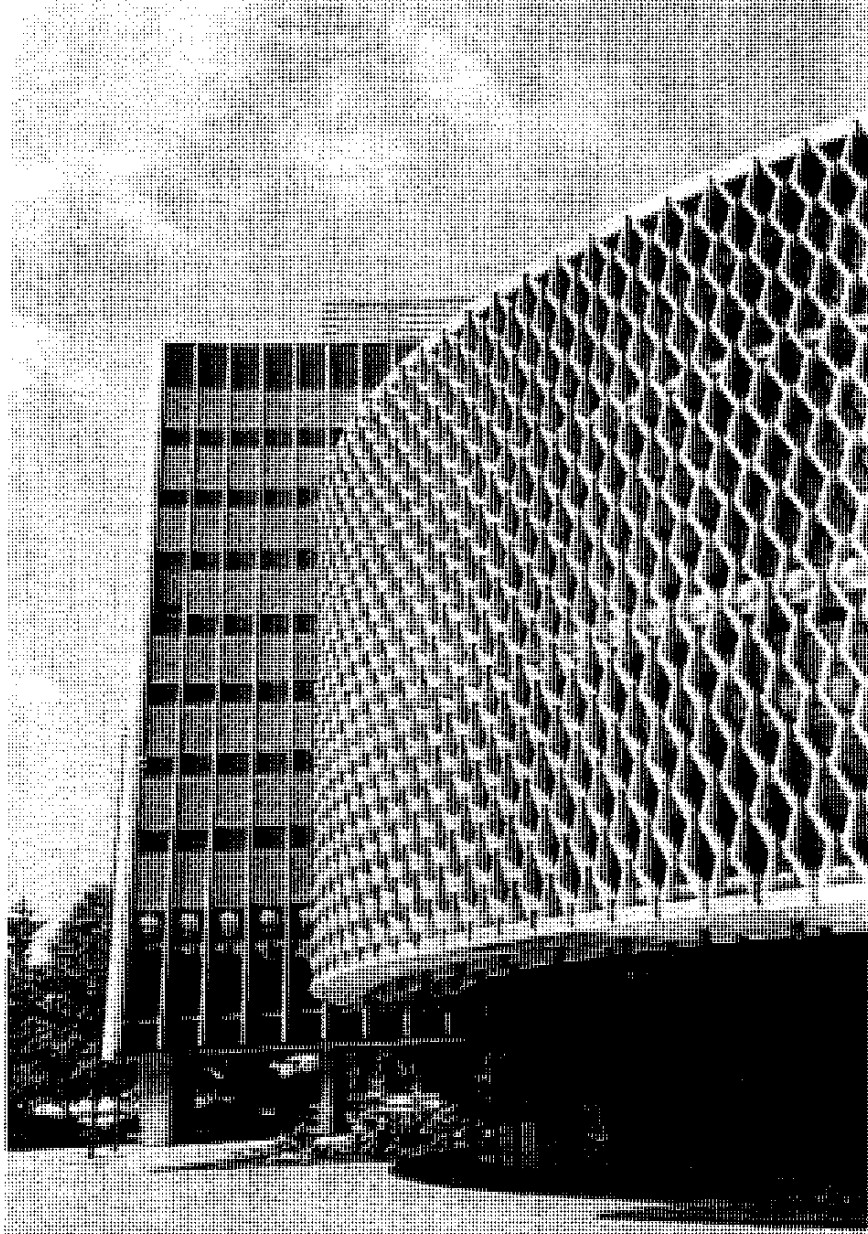
Top Row: José Ramos, Harry Philippeaux, Peter Jiggins, Will Hartzell, Errol Grimes, Moenindre Mahadew, Chip Landman, Lorenz Chan

Standing: Xavier Saavedra, Daniel Okun, Yolanda Virgil (front), Joseph Cotruvo (rear), Ed White, Victor Kimm (rear), Gerardo Galvis, Guillermo Orozco, Armando Rivera, Gonzalo Ordóñez, Guy Howard, Jamie Bartram, Fernando González, Enzo Lima, Otto Rosasco, Alvaro Camacho, Saúl Salmeron (rear), José Gómez, Henry Hernández

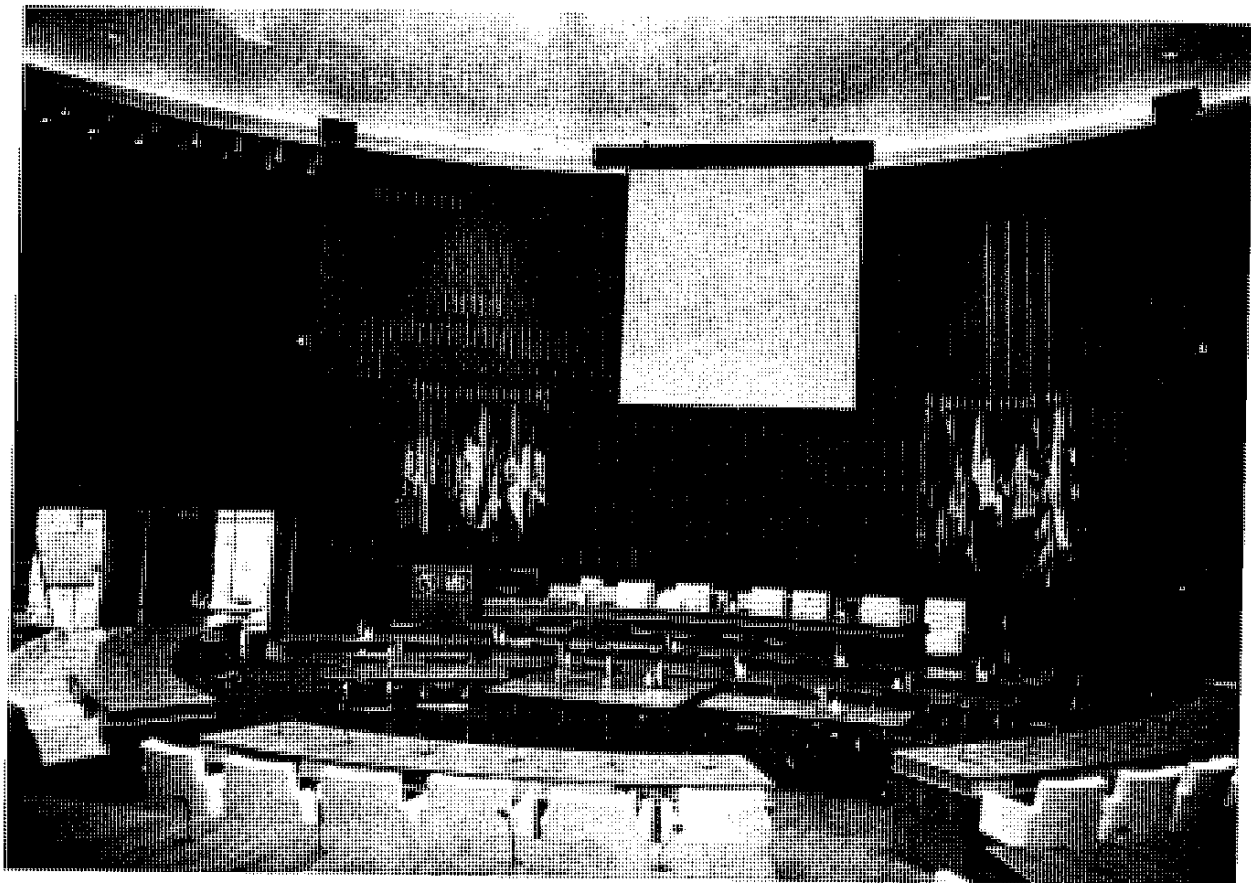
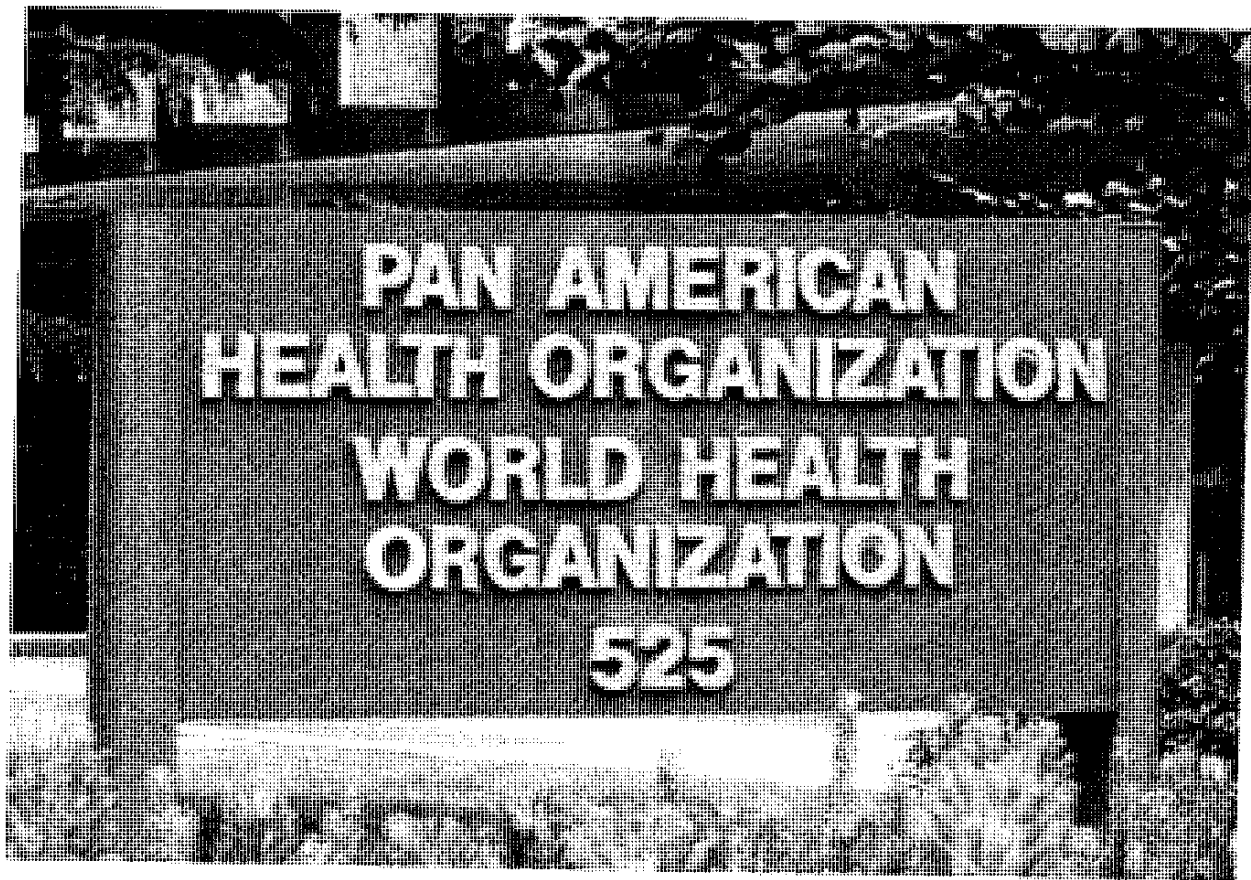
Seated: Ana Treasure, María Cruz, Rosa Abreau, Felipe Solsona, Kenia Mejía, Ophelia Nieto, Lucy Segura, Patricia Linsky

Floor: William Gaither, Joseph Pezely, Carlos Morales, John Austin, John Hofmeyr, Ronald Linsky

Not pictured: Terrence Thompson and Raymond Reid



# Working Groups' Reports



## **INTRODUCTION**

### **Summary Descriptions of Highest Priority Barriers to Providing Safe Drinking Water Through Small Systems**

Working Groups comprising three or four participants were appointed to develop a consolidated and refined version of each of the top ten major barrier areas identified during the NGT Workshop described in Part 2 of this report. Each group was encouraged to revise, if necessary, their priority barrier title if as a result of the group's discussions it was determined that it would enhance the understanding of the identified barrier. Thus, while the ten highest priority barriers presented in Part 1 of this report correspond, one for one, to the ten highest priority major barriers areas listed in Part 2, the titles may differ.

Late in the morning of the third day of the Workshop, the ten Working Groups began presenting their consolidated reports to the other participants. These presentations prompted discussion, feedback, and suggestions to clarify or enhance the reports. All reports were presented during the period, and all the authors approved of any additional changes to the reports prior to their departure.



## **Absence or Weakness Capability at Local, Regional, and National Levels for Addressing Water-Related Functions**

### **WORKING GROUP MEMBERS:**

Camacho, Okun, and Mahadew

---

#### ***Importance:***

##### **Local level:**

- Leadership through a community organization.
- Assessment of the needs
- Promotion.
- Education.
- Management (of the services).

##### **Regional level:**

There should be an institutional capability to provide the following services to the local community:

- Technical assistance.
- Training to the public and communities.
- Education to the public (users).
- Establishment of a management information system to collect water related data from the communities.



- Water quality and health monitoring.
- Assistance to community management procedures.
- Periodic surveillance.
- Assistance with acquiring supplies and equipment.

#### National Level:

At the national level, the most important items are:

- Sectoral planning.
- Legislation.
- Regulation of water quality, level of services, technical standards, etc.
- Professional and technical education.
- Research with extension services through capacity centers.
- Provide economies and efficiencies of scale.
- Coordinate the international agreements.

#### ***Suggest an approach to overcoming the barrier:***

- Institutional building should be a part of international financial and technical assistance.
- Initiation of change in institutional capacity building should be promoted and is the responsibility of each partner at each level. For long-term effectiveness, there is a need to maintain pressure from the users.
- There should be international agreements to exchange knowledge.

#### ***Recommended task group membership:***

- Lendernorth
- Alain Mathys
- Gerardo Galvis

***Comments:***

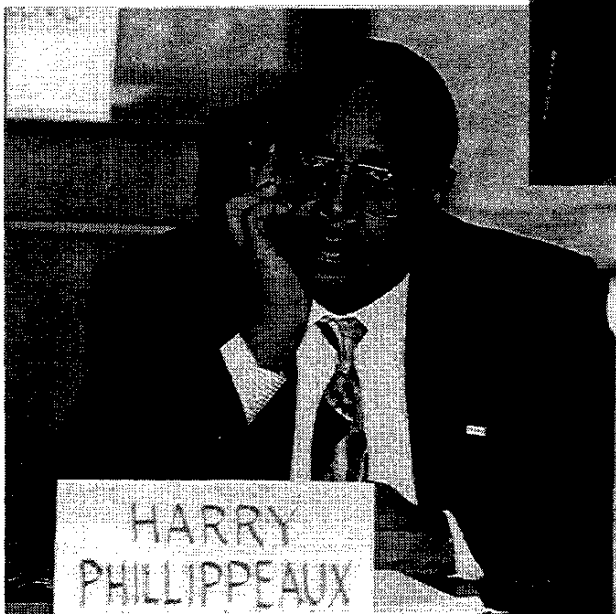
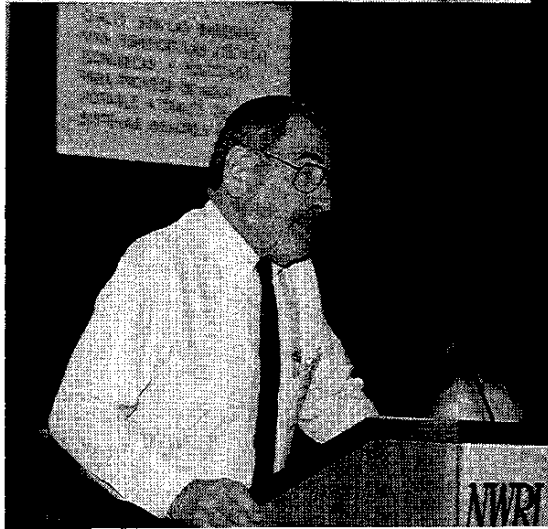
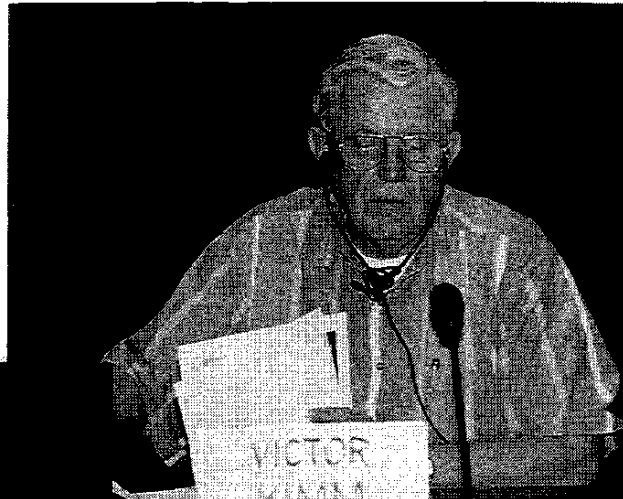
"Training should be added to the initial listing under importance. The word 'educator' in English normally does not include training. Also, the concept of performance indicators should be added so that monitoring and surveillance can be measured against these indicators. Should consider consolidating #1 and #7." - John H. Austin

"Merge Priority #1,4, 3, and 6 to address overall policy framework and remove 'extension service' from here. Merge Priority #2 and 7, and emphasize 'extension services.' Material on external financing from the above to move into #5. Remaining Priorities are reasonably self-combined." - Jamie Bartram

"Apparently barriers #1, 2, and 7 are very similar. It would be worth the trouble to look into the possibility of combining them." - José Antonio Ramos Chorro

"The barrier title may need further refinement to make clear the distinction between this barrier and Priority #2, and also Priority #7 groups." - Peter Jiggins

"Economies and efficiencies of scale can result from regionalization of management of water-related activities. Economies of scale result from savings, for example, in the purchase of supplies. Efficiencies of scale result from the availability of better qualified technical and management personnel who can address problems more effectively than if only local personnel are available to a utility. Small water systems can be sustainable, but it is difficult to assure cost recovery. Regionalization can improve the potential for sustainability far better than other interventions. Regionalization can be done on a limited or on a large scale. Leadership initiating regionalization must come at high government levels. A key to assuring sustainability of water-related facilities at the local level in small systems is community organization and local leadership. This overlaps Priority #2." - Daniel A. Okun



## PRIORITY 2

# **Lack of Local Institutional Capacity (Water Supply Utilities, Community Groups, etc.) to Provide Proper Operations and Maintenance (O&M) of Small Water Systems to Ensure Sustainable Operations**

### **WORKING GROUP MEMBERS:**

Kimm, Okun, Ordóñez, and Philippeaux

---

### ***Importance:***

- This barrier can affect the life span of the system and quality of the water provided.
- Need to increase coverage and optimize return on capital investments.
- Without assurance of cost recovery and O&M, the water supply facility will not be sustainable.
- Ensure good services to improve health benefits for customers.
- Avoid the waste of capital investments.
- Maintain credibility among users.

### ***Suggest an approach to overcoming the barrier:***

- Adequate tariff structures are critical to the sustainability of small systems.
- Community participation is important in all aspects of planning, implementing, and managing small systems.

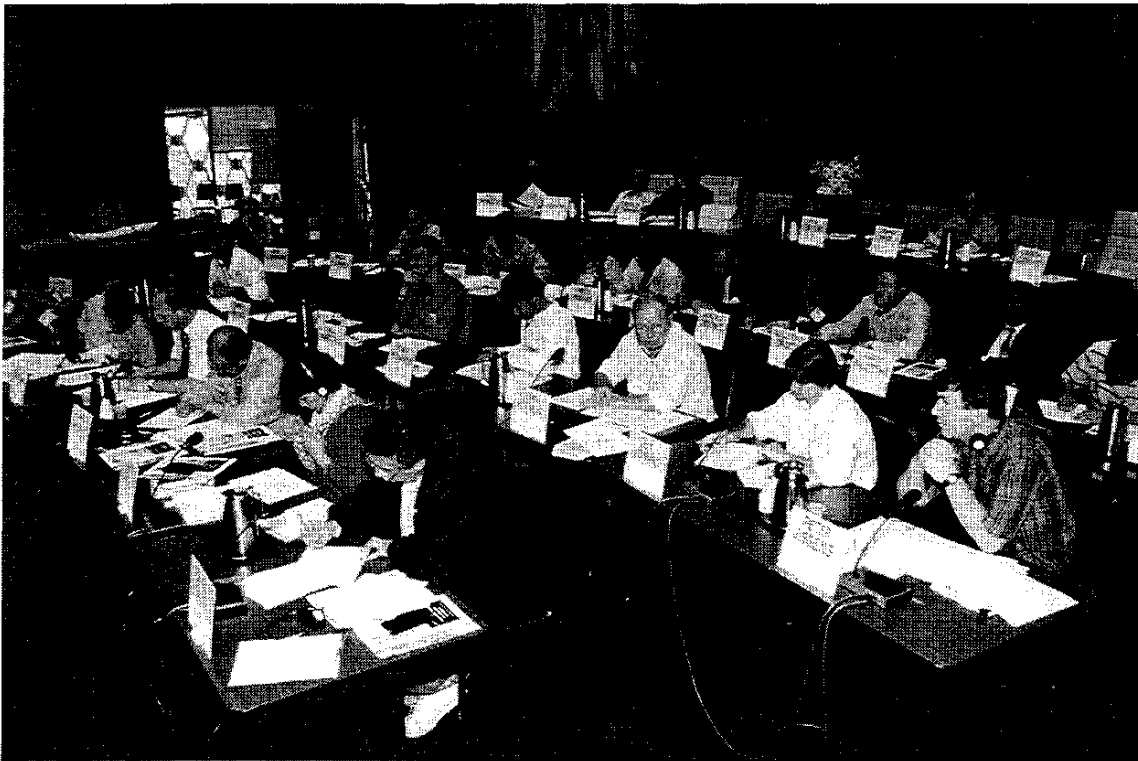
- Local and/or regional authorities must promote the management capabilities of small systems to provide quality services, effectively use resources, collect charges for water service, and provide adequate O&M.
- For small drinking water systems, ongoing training for managers, operators, and residents is essential throughout the life of the system.
- Where feasible, the central government should implement a surveillance policy for drinking water services and water quality.
- An effective national program should promote association of small system operators.
- Historically, funding institutions and professional associations have given highest priority to the construction of new small water systems. In the future, equal priority should be given to providing effective O&M of small systems.

***Recommended task group membership:***

- Victor Kimm, University of Southern California
- Harry Philippeaux, PAHO, Barbados
- Dan Okun, University of North Carolina
- Gonzalo A. Ordóñez, PAHO, Costa Rica
- Herbert Farrer, Costa Rica
- Felipe Solsona, CEPIS, Peru
- Sergio Caporali, CEPIS, Peru
- Fred Reiff, Washington, DC
- Terry McClean, Washington State, USA
- Ceager Hall, UNICEF, Liberia, P.O. Box 5747, New York, NY 10163
- Patricia Brandon, PAHO, Barbados
- Della Dash, California
- Joseph Cotruvo, NSF, Washington, DC

*Comments:*

"Merge Priority 1, 4, 3, and 6 to address overall policy framework and remove 'extension service' from here. Merge Priority 2 and 7 and emphasize 'extension services.' Material on external financing from the above to move into 5. Remaining priorities are reasonably self-contained." - Jamie Bartram





# **Absence of Commitment from Decision Makers That Promote Appropriate Socio-Economic Development of Policies That Strengthen Institutions, Programs, and Projects**

## **WORKING GROUP MEMBERS:**

Abreu, Mejía, Rivera, and Thompson

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### ***Importance:***

Without adequate policies, it was shown that it is practically unattainable, from an economic point of view, to offer safe water to the majority of people that reside in small communities, among other reasons, because:

- It limits the ability of a country from making the most efficient use of available resources, both economic and human.
- The investment is not prioritized towards this objective.
- The possibility of attracting internal and external financial resources would be limited.
- Continuity of programs and projects would be affected, slowing down the obtaining of goals in the short, medium, and long term.
- Institutional fortification would be limited affecting the responsible organizations from planning and executing projects, as well as those who provide drinking water services to the communities.
- Generate few decisions that promote empowerment, understanding it as the active and responsible participation of the community in the decisions that affect them.
- The use of appropriate legal policies that allow small populations to be able to count on water services would not be promoted.



***Suggest an approach to overcoming the barrier:***

- Prepare and disseminate a study, with terms of appropriate references, that evaluates the political, economic, and social advantages of providing drinking water to small and medium communities.
- Create and/or strengthen the regulatory agencies in the countries for the drinking water sector that forms and pursues the application of politics and actions of the residents in small communities and to strengthen the institutions of the sector.
- Encourage international credit organizations, in their requirements for loans, to require the inclusion of directed actions to empower the communities in utilizing appropriate technologies and in strengthening the drinking water sector and its institutions.
- Include the leaders of financial institutions in meetings where they can discuss this problem.
- Update legal and regulatory policies used in the drinking water sector of the countries.
- Negotiate that the agendas of important international meetings, where staff members participate from the highest political levels of the countries, include discussions of the needs and advantages of providing safe water to small and medium communities.

***Comments:***

“Merge Priority 1, 4, 3 and 6 to address overall policy framework and remove ‘extension service’ from here. Merge Priority 2 and 7 and emphasize ‘extension service.’ Material on external financing from the above to move into 5.” – Jamie Bartram

“This can be incorporated in Priority 1, probably not necessary, because it follows Priority 1.” – Daniel A. Okun

## **Need to Coordinate the Efforts of Various Entities in Delivering Environmental Health Services Through an Integrated Approach**

### **WORKING GROUP MEMBERS:**

Austin, Cruz, and Lima

---

### ***Importance:***

The state has traditionally played a paternal role arriving with solutions that are not always adapted to the needs of the community.

Some states are initiating decentralization-deconcentration processes and developing actions with responsibility on local levels.

On the local level, conflicts are manifested between that which the state can offer and that which the community needs.

The communities need to become involved in the process of analyzing environmental health problems, defining the alternatives and courses of action, and identifying resources.

Community participation has a fundamental role in the generation of its own development.

Decades of top-down imposed solutions without community participation have resulted in the abandonment of the systems or their deterioration as a consequence of a feeling of a lack of ownership that guarantees their continuation in time.

Without an integral solution of environmental health services that include qualification programs, monitoring, and technical assistance, the conditions of community development will not improve.

***Suggest an approach to overcoming the barrier:***

- Improve the ability of the local governments to significantly involve the communities in the planning and implementation of development projects.
- Favor the “empowerment” on the part of the communities in order to develop their development projects.
  - Identify the different people that will participate in the process.
  - Include necessity of INTERDISCIPLINARY and MULTI-INSTITUTIONALITY.
  - Consider the differences of the community members (cultural, social, ideological, economic, etc.).
  - Articulate the existing diverse interests so they can be heard.
  - Consider different important focuses for integration (e.g., strategic [FODA analysis], risk, epidemiological, gender).
  - Initiate the cycle of the specific project.
  - Evaluate the process in systematic form.
  - Replicate the process in other communities.

***Recommended task group membership:***

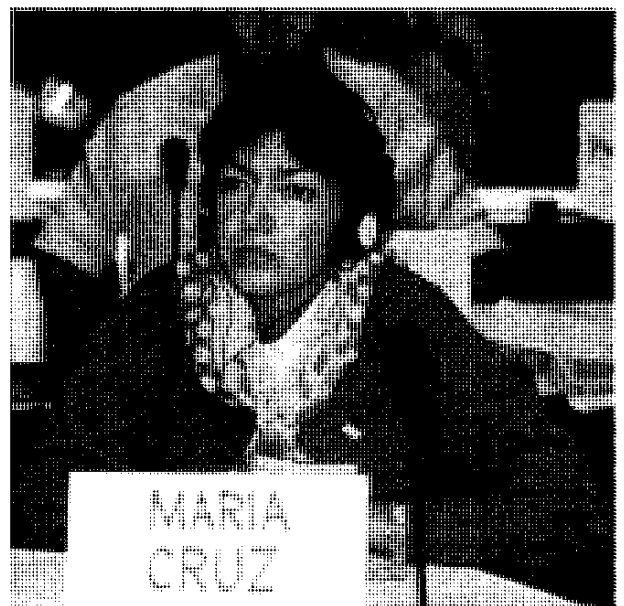
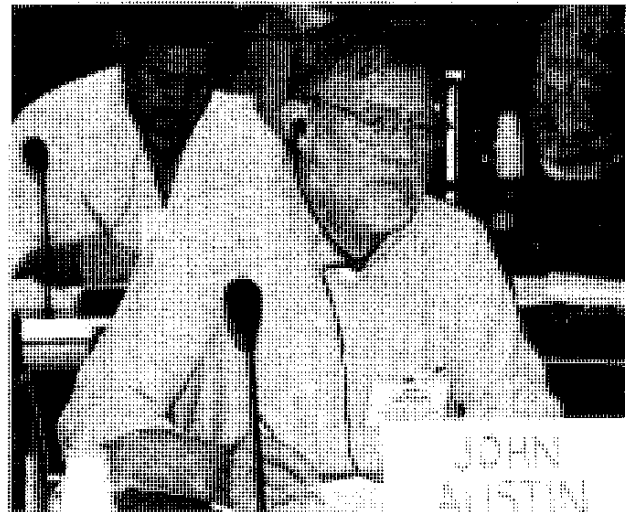
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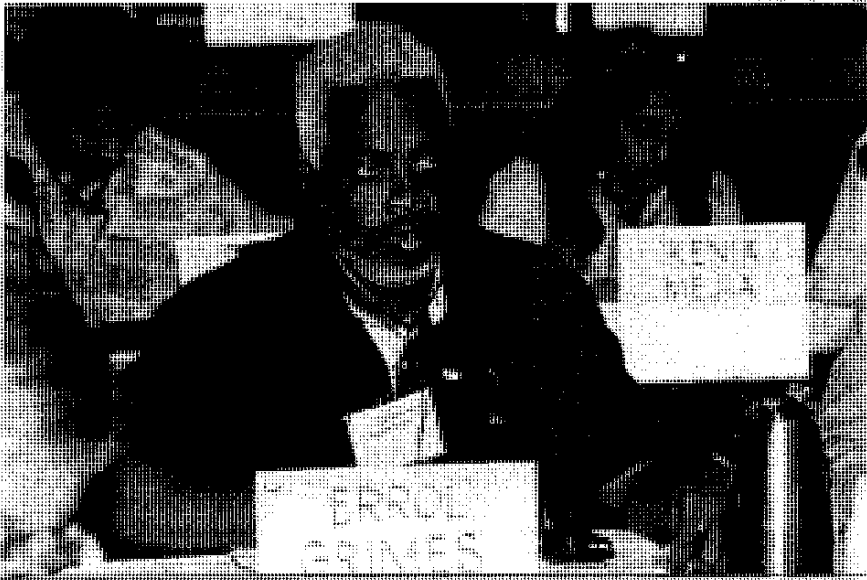
***Comments:***

“Merge Priority 1, 4, 3, and 6 to address overall policy framework and remove ‘extension service’ from here.” - Jamie Bartram

“That the borrowing or donor agencies include in their recommendations that the programs supporting drinking water supply maintain good relationships with local governments.” - Fernando González

“Strongly encourage the funding agencies to incorporate in their funding applications/approvals a major criteria to encourage a community-based decision-making component. Also see if it is possible to have funding/bilateral donors meet and come to an across-the-boards agreement that there will be a uniformity among them to exact such a component as integral to their funding participation.” - Ed White





# **Inadequate Funding of Capital and Operating Expenditures**

## **WORKING GROUP MEMBERS:**

Grimes, Hofmeyr, and Treasure

---

### ***Importance:***

- Inability of water agency to access funds for both capital and recurrent expenditure limits the ability of the agency to deliver the service.
- The social cost of doing nothing can be measured by high mortality rates and increased water-borne diseases.
- Cost of delaying a decision is reflected by:
  - inflation costs
  - inefficiency; reacting to crises rather than prevention
- Cultural issue – there is a need to eliminate the perception that water is a free commodity.
- Funding conditions are sometimes very onerous.
- Larger projects are preferred over small projects.
- Political interference affects obtaining funding.
- Government tends to focus on World Bank types of lending institutions with all their attending bureaucracies rather than direct financing commercial banks.
- Many agencies – State run companies – are not solvent and cannot meet the operating costs or capital funds for metering, pipelines, and source development.

***Suggest an approach to overcoming the barrier:***

- Set tariffs that reflect actual cost and implement a public education and information program to change the perception that water is free. Improve customer services; measure efficiencies by the response time to customer complaints.
- Approval period for project funding needs to be shortened at funding agency level by the elimination of unnecessary bureaucracy. The banks need to establish a checklist to fast track approval for small systems funding. They need to change their conventional approach of lending only to government and allow regional authorities and town councils to access funds also.
- Lending institutions need to display greater flexibility in utilizing local resources (i.e., men, material, machinery).
- Support politicians in the application for and acquisition of direct government funding.
- Utilize a self-help approach that is community based and coordinated by the agency.

***Recommended task group membership:***

- Ana Treasure
- Errol Grimes

***Comments:***

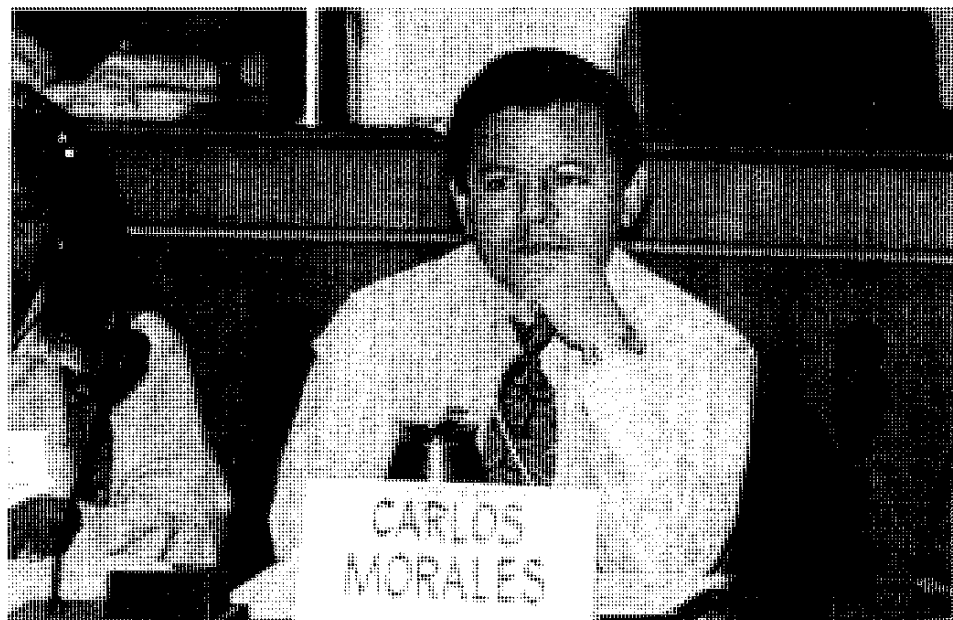
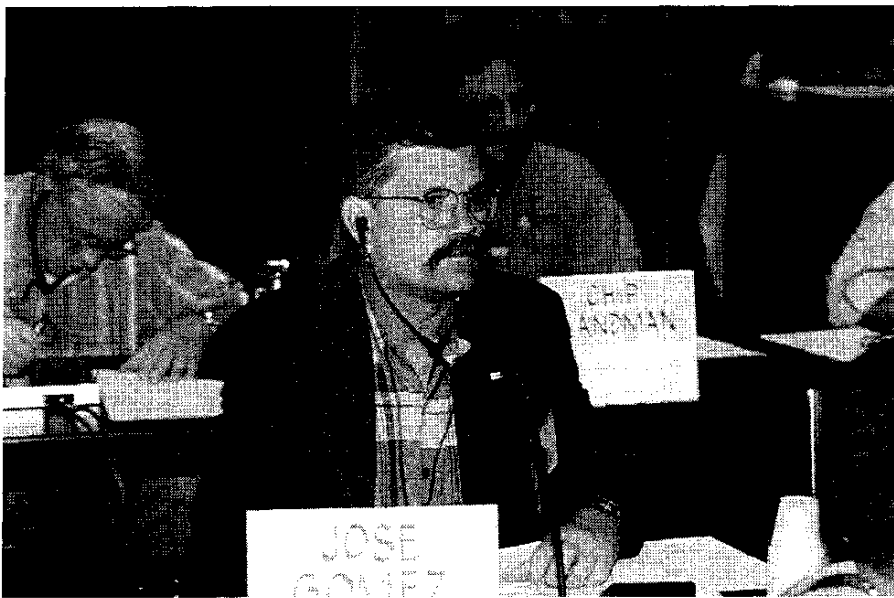
"I asked them to review the role of the national authorities in financing and traveling for the international resources. It does not seem healthful to me that they directly arrive at the regions nor from the economic point of view or technical because it loses a form of preparation and then is able to multiply. In any case, it seems to me that any effort that is made by diminishing useless transactions is important, but not those that represent the fortification of the ability to gesture by the countries." - María Elena Cruz

"That the Pan American Health Organization supports the countries with problems of collection of donations in informing that organizations of governments are opposed to supporting the supply of potable water with non-reimbursable financing." - Fernando González

"Government-government interaction is important, as is the link between multi-lateral funding agencies. Whilst governments may not always be truly responsive to their populations, they do take responsibility for the development of their population. They are more accountable to their populations than are external organizations. Lack of government interaction may lead to political problems." - Guy Howard







## **Lack of Awareness Among Decision Makers and the Local Communities**

### **WORKING GROUP MEMBERS:**

Gómez, Morales, and Solsona

---

### ***Importance:***

Politicians, high-level government officials, and even administrators in the health offices of numerous countries in the region lack information with regard to providing safe water and sanitation services to small communities. The result is a class of decision-makers who are practically indifferent to the needs of communities.

Those levels of decision-making have not realized yet the intrinsic power of such a development. According to the World Health Organization, no individual decisions at a national level will have a larger impact on the general welfare and in the individual development like the provision of water supply and sanitation.

On the other hand, the social mass from the organized groups to the last user (passing by the intermediate functions of the health ministries, the financial agencies, the NGOs, the churches, the neighboring groups, etc.) have not had the opportunity to clearly understand that a relationship exists between the unsafe water and the diseases with which they unfortunately already have learned coexists.

The result is a political class that is not committed to political decisions for implementing safe drinking water programs due to the lack of understanding of the significance of providing safe water and sanitation and the dearth of political popular pressure from communities that do not demand solutions in this area, thus precluding central powers from developing the aggressive strategies and policies that this field requires.

As a result communities endure high incidence of ailments that could be easily alleviated or avoided.

***Suggest an approach to overcoming the barrier:***

- Create and/or improve the mechanisms or regional structures to ensure compliance to government standards for water and sanitation.
- Develop horizontal cooperation among countries in search of solutions to common problems.
- Disclose commitments from politicians, national institutions, professional organizations and the population in general to help promote small systems.
- Offer guidelines for the development of national processes for the pursuit of established commitments.
- Strengthen political support for improving water quality by establishing national and institutional strategies to ensure that the issues receive the attention of decision-makers.
- Promote the development of the legislative process and water standards and sanitation with the support of international governments and organizations.
- Create and/or improve data and information systems regarding water's role in the health/disease process so as to focus on risk in the planning works of distant health institutions.
- Develop local and national campaigns to improve people's awareness regarding: water's relationship to health and disease; water resources protection; alternative technologies for small systems, etc.

***Comments:***

"Merge Priorities 1, 3, 4, and 6 to address overall policy framework ..." – Jamie Bartram

"I think that Barrier No. 6 could be joined with No. 3, or in any case completely with it." – Armando Rivers.

## **Lack of a Permanent Organization That Monitors and Provides Technical Assistance to the Communities That Administer Their Water Systems**

### **WORKING GROUP MEMBERS:**

Bartram, González, and Ramos

### ***Importance:***

There is good evidence that a large proportion of small systems fail soon after construction. Most small systems have short working lives and are regularly contaminated, often severely. Similar problems are encountered worldwide and occur regardless of whether "appropriate" technologies or community participation have occurred.

Most small systems are managed by communities themselves. There is no evidence that this is changing, and it is generally considered the most sustainable approach.

There is experience to suggest that improved support systems to community management can contribute to improved system performance and to increased effective working lives. It may also contribute to the effectiveness of programs to develop and implement projects for the construction of new systems and for the rehabilitation and extension of existing systems.

Support systems to community management may readily incorporate the function of monitoring. This may improve the feasibility and effectiveness of monitoring. By collecting and analyzing information, such systems may contribute to the formulation of coherent policy and strategies for water supply at national and regional levels.

***Suggest an approach to overcoming the barrier:***

General Approach

- Reinforce municipalities or create decentralized organizations to provide technical assistance. The overall system should be centrally (nationally) constituted and coordinated; should be operationally based at the municipal or regional level; and should operate with communities.
- Promote community participation to raise a sense of ownership; minimize demands upon external support; and create points of linkage for the support system.
- Non-governmental institutions could also be a source of assistance to small communities.
- Ensure that agencies, which finance construction, make provisions for a period of follow-up to ensure success and minimize subsequent requirements for support.

Practical Implications

An effective support system requires effective links to other concerned sectors (e.g., health, water supply) at both central and regional levels, and this implies their active participation. It would operate both through provisions of a point of contact and reference on demand and through programmed visits to communities.

The functions that could be adopted by such a system might include:

- Water supply and water quality monitoring.
- Supply of chemicals, such as chlorine.
- Legal counsel.
- Guidance/technical input to project formulation.
- Training of (its own) promoters and of community members involved in administration, operations and maintenance.

### Recommendations for Action

- Recover documents and disseminate experiences (case studies) from diverse countries. Distill "good practices" from there.
- Support the implementation of a small number of pilot projects in diverse locations.
- Recover documents and disseminate the experience from those pilot projects.

### ***Recommended task group membership:***

- Gerardo Burgermaester, COSUDE.
- Jamie Bartram, Barriers workshop participant.
- Felipe Solsona, Barriers workshop participant.

### ***Comments:***

"I suggest you add the development of performance indicators for monitoring and evaluation to improve sustainability. Consider consolidating with Priority #1." - John H. Austin

"Merge Priority 1, 4, 3 and 6 to address overall policy framework and remove 'extension service from here. Merge Priority 2 and 7 and emphasize 'extension services.' Material on external financing from the above to move into Priority 5. Remaining priorities are reasonably self-contained." - Jamie Bartram

"The establishment of a 'self help' agency which will work with the community is an option. This agency can deal with different types of community projects, including small water systems. The agency could, for instance, develop a clear project outline." - Errol Grimes

"The change to subject of need to support communities which manage their own support is one important aspect which is identified in Priority 9." - Peter Jiggins

"The new title makes this barrier very similar to the No. 1. I suggest to keep the basic idea of lacking a permanent organization to provide technical assistance to the communities." - Gonzalo A. Ordóñez



## **Limited Community Participation in All Phases of a Project Contributes Significantly to the Failure of Programs**

### **WORKING GROUP MEMBERS:**

Galvis, Hernández, and White

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#### ***Importance:***

- The use of a community-based approach avoids the inappropriate selection of levels of service and technologies by taking into consideration a community's needs, willingness and ability to pay, and capacity to administer, manage and operate small systems.
- A community-based approach will facilitate consensus building when identifying the requirements needed at the local level to sustain the administration, operations, and maintenance of small systems. The consensus-building process should include a way in which this support will be provided on a timely basis.
- A community that participates in a fair working environment that is free from discrimination (e.g., gender, minority groups) will improve its ability to handle conflicts, make decisions, and negotiate. To summarize, in fulfillment of this process, the community will be better prepared to assume the management of its own development with responsibility.

#### ***Suggest an approach to overcoming the barrier:***

- Recognize that decision making based on community participation, in all the stages of the project, can potentially require more time and effort than the traditionally top-down approach.
- Consider the capacity of payment both in the stages of construction management and O&M in order to improve the sustainability of the investments.
- All of the participants who are involved in programs or projects should recognize the importance and the need of working within the framework of the new strategies that are oriented to decisions based on community participation.



- Schedule formal and informal meetings (brainstorming) and training activities for staff (clerical, professional, technical, workers, etc.) who potentially might be involved in the negotiation or execution of programs and projects.
- Select demonstration projects or plan and carry out new learning and demonstration projects as tools to promote and popularize the scope and merits of scheduled projects based on community participation.
- Establish interdisciplinary and interinstitutional working groups; secure a more holistic vision integral in the process of working in teams with the community. These groups can be categorized or estimated within the framework of the learning or demonstration projects before they are started.
- Identify people with experience to participate in the working groups in order to accelerate the learning processes.
- Improve the availability and access to relevant and good quality information on concepts and cases (experiences) related to this work strategy.
- Schedule orientation activities that can demonstrate the merits and benefits of programs/projects that were implemented based on community participation; involve leaders and communications media (press, radio, and television).

***Recommended task group membership:***

- María Dominique de Suriname, ENDA Latin America
- Ed White, Self Help Support and Systems, USA
- Christine Van Weyk; Jan Teun Visshcher, IRC, The Netherlands
- Nohora Londoño – Ministry of Development/Colombia
- Maricela García, Silena Vargas, Edgar Quiroga, G. Galvis, Cinara, Colombia

***Comments:***

"This overlaps a great deal with Priority 4, and consolidation should be considered. Reference to 'building community partnerships for change' in English and Spanish should be referenced for Priority 4 and 8." - John H. Austin

## **Lack of Awareness About Reliable, Affordable, and Cost-Effective Technologies Available Which with Proper Control, Monitoring and Support Can Be Applied to Solve Site-Specific Water Treatment Requirements in Light of Technical, Social, and Cultural Circumstances**

### **WORKING GROUP MEMBERS:**

Hartzell, Jiggins, and Landman.

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### ***Importance:***

- Without information and education about currently available treatment options and their performance capabilities, effective decision making will not occur.
- Without designing-in and implementing adequate control of treatment systems in light of site-specific conditions presented, and without proper monitoring to confirm system performance, long-term cost-effective operation of treatment systems is not likely.
- Without providing adequate support mechanisms, the success of applying sophisticated water treatment systems in small communities is unlikely.
- Proper application of treatment technology requires that systems be affordable and cost effective to the end users.
- Local acceptance of technology is required for its successful application; social and cultural factors affect this local acceptance.

***Suggest an approach to overcoming the barrier:***

Develop and distribute information about available, cost-effective treatment technologies, control and monitoring schemes, and system support options available coupled with a willingness to apply technologies as appropriate to address site-specific water quality requirements.

***Comments:***

"New title is too long, 'a suggestion' lack of awareness of appropriate technology solutions. The word awareness can be added to the old title." - Errol Grimes

"PAHO or a similar type agency should develop and make available a directory of 'technology solutions' used successfully to contract small water systems. This directory can detail actual technology solutions and/or references of companies that have implemented for provide appropriate technical solutions." - Errol Grimes

"A conclusion of examining technology may well be that available technology is not really a barrier to providing water treatment in small communities. While this comment may not be appropriate to this priority, it may be included in the report itself. The NSF Symposium concentrated on technology - but this is really a diversion from addressing the real barriers which are based on inadequate institutions." - Daniel A. Okun



# **The Capacity of Users of Small Systems to Pay the Investment, and Operations and Maintenance (O&M) Costs of Water Supplies**

## **WORKING GROUP MEMBERS:**

Orozco, Howard, and Rosasco

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### ***Importance:***

Some small communities, because of their size and location, lack the resources to pay for investments and recurrent costs of water supply. The small population increases per capita costs, and limited incomes restrict access to credit schemes and bank loans. Small populations may make these communities a low political priority for investment.

Small populations may limit the technology that can be used, and in some situations this may prove an absolute barrier to safe water supply if cost-recovery drives water supply investment.

The cost of water tariffs may exceed the willingness to pay of households and communities. Even where households can afford the cost of water, they may not participate because they refuse to pay the tariff demanded.

A further barrier is related to income and spending patterns of communities that limit both ability and willingness to pay. In rural areas, income may be realized only once or twice per year, which may drastically affect sustainability of water supplies that require more frequent expenditures on O&M. Tariffs collected at infrequent intervals in communities with erratic incomes and the inability to save may prevent participation.

### ***Suggest an approach to overcoming the barrier:***

A key priority is to redefine cost-benefit analysis to place a greater emphasis on social benefits, bearing in mind that investments in small communities may lead to indirect savings in other areas. Furthermore, greater attention should be paid to the total benefit derived from aggregated investment in small communities, rather than a case-by-case approach.

Small systems development funds should be established with clear guidelines to facilitate access for small communities to investment capital.

Community-based approaches must be used to improve small water supplies. Such approaches should involve the community at all stages of water supply provision and, in particular, in the establishment of tariffs and payment systems and selection of technology.

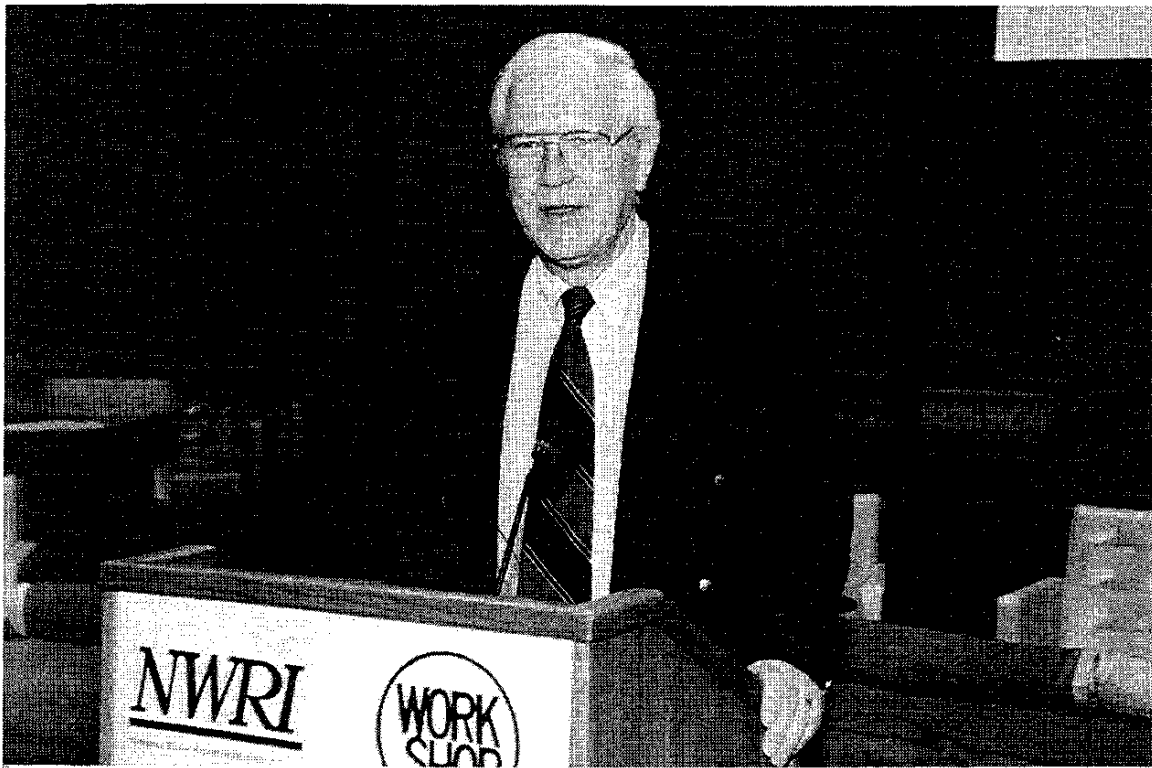
More flexible payment schemes are required to recover both capital and recurrent costs. This implies a more long-term approach from governments, external support agencies, and NGOs to small system development. Communities should be supported to establish mechanisms for saving funds to support flexible payment systems.

An integrated approach to the development of small communities is required to reduce costs and increase impacts of interventions. Such approaches should address income-generation and require inter-Sectoral collaboration.

***Recommended task group membership:***

- Sergio Caporelli, CEPIS
- Jennifer Sara, World Bank
- Martin Callsen, WUSC
- Richard Franceys, IHE DELFT
- Gordon McGranahan, Stockholm Environment Institute
- Carolyn Stephens, London School of Health and Tropical Medicine
- Guy Whittingham
- Guy Howard
- Otto Rosasco
- Guillermo Orozco

## **NGT Workshop**



## INTRODUCTION

Professors Delbecq and Van de Ven developed the Nominal Group Technique (NGT) in the late 1960's at the University of Wisconsin. Their goal was to design a process that would allow a group of individuals to meet and quickly come to consensus. They recognised that a process was needed that would eliminate or diminish the usual delays that result from individuals taking time to establish his or her own credentials in the eyes of the group, or the dominance of the meeting by a particular vocal individual or individuals. Their technique allows a group of individuals to address efficiently a question that could not be resolved satisfactorily by a single individual. This technique has been improved and refined by Dr. William S. Gaither who facilitated this workshop.

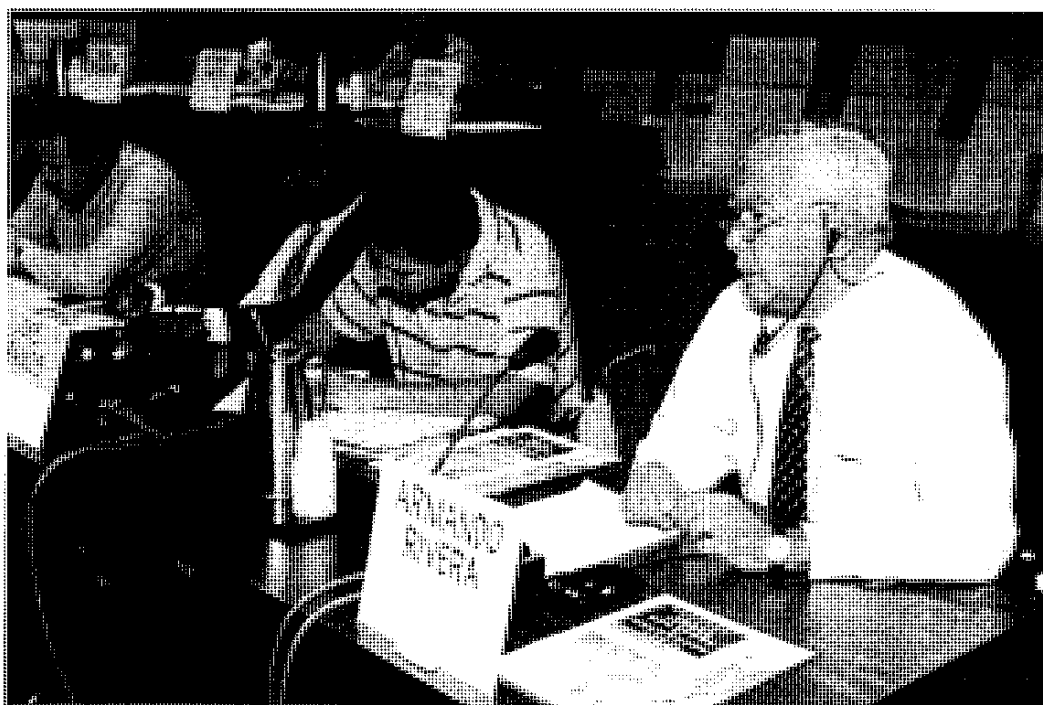
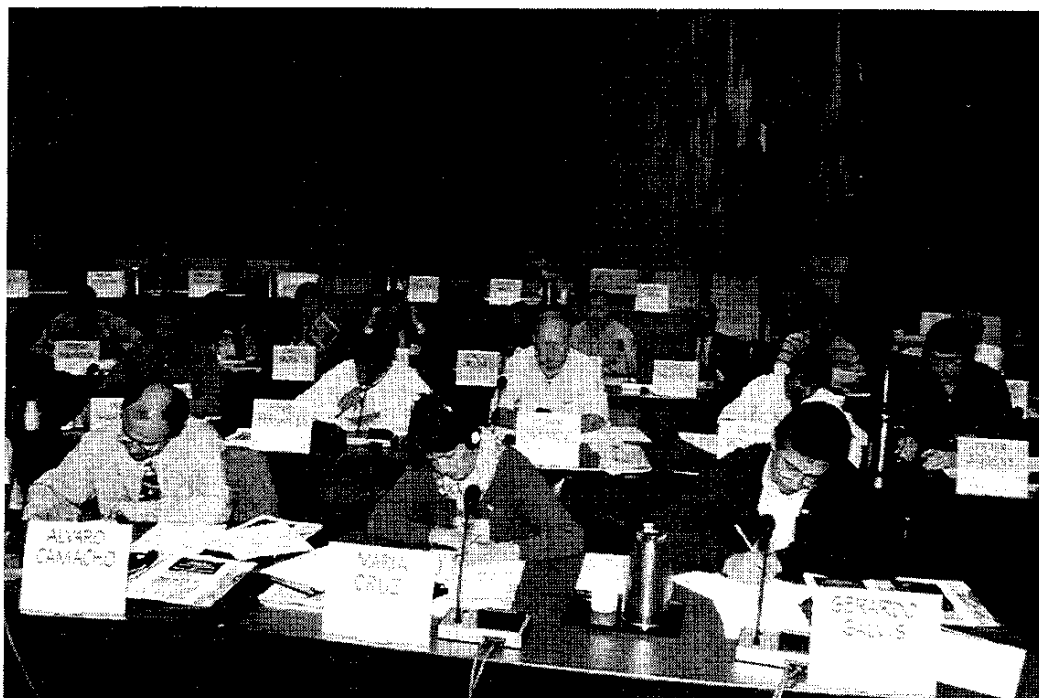
In this workshop, the NGT process was used to help twenty-nine participants respond to the question: *What are the most significant barriers (technical, economic, and political) to providing safe drinking water through small systems?*

The workshop commenced on the evening of May 13th where the guidelines were reviewed and the first assignment passed out to the participants. The NGT process began on the second day, May 14th, and was comprised of three distinct steps:

- Barrier identification.
- Consolidation of barriers into major barrier groups, minimising overlap between groups.
- Individual ranking of the ten highest priority barriers.

The participants identified 80 barriers. The titles of these barriers were rapidly posted on the walls of the workroom in both English and Spanish. During the afternoon and evening sessions, participants were guided through a systematic discussion to consolidate these 80 barriers down to 32 major barrier groups. At the end of the consolidation process each participant completed a Priority Ranking form, indicating his or her top ten barriers. A significant part of this segment of the overall NGT process is the revision and editing of text by the participants. In every case the participants, as authors, approved their final edited text prior to departure.





## **Absence of Institutional Capacity at Local, Regional and National Government Levels for Addressing Water Supply Issues**

### **ORIGINATORS:**

Okun on behalf of himself, Camacho, Galvis, Mahadew, Rivera, and White

### ***Barrier description:***

At local level, institutions are often not capable of initiating water supply projects or assuring the sustainability of projects begun with outside help.

At higher government levels, institutions are often not equipped to help local communities with technical or financial assistance.

### ***Importance:***

Such institutions are necessary to initiate and sustain water supply projects in small communities. Local and governmental institutional capacity constitutes the major distinction between communities in developing and industrialized countries. Strong government institutions can help develop regional solutions that can provide economies and efficiencies of scale.

### ***How to overcome the barrier:***

If communities are to obtain water supply service, people in the community must organize to establish local institutions that can pressure government agencies to provide the necessary assistance. If the government institutions are inadequate, community pressure can help provide pressure to improve the institution.

When external financial assistance is requested, a high priority for the use of funds should be institutional capacity building in the water sector.

*The following barriers were consolidated as a part of the previous title:*

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**Title:** Absence of institutional capacity at local, regional, and national levels for addressing a wide array of water-related functions

**Originator:** Okun

***Barrier description:***

Institutions may exist, but they often do not have the capacity to perform the necessary services. Such services are:

- At local level: initiate actions to provide and assure sustainability of facilities and resources, including cost recovery.
- At higher governmental levels: provide planning, regulations, financial assistance, technical assistance, etc.

***Importance:***

Without overcoming this barrier, sustainability will be impossible. Overcoming the barrier is the beginning of addressing all the problems of water supply and sanitation. Institutional capacity is the major difference between performance in industrialized and developing countries.

***How to overcome the barrier:***

With pressure (demand) from local community leaders, improve local institutions and demand assistance from national agencies.

Institutions with adequate capacity at all governmental levels are necessary to initiate and sustain water systems and related projects. For example, such institutions might stimulate regional approaches that are closer to people than government, yet are large enough to provide stronger institutions than generally available at local level.

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***Title:***                      **Lack of policies aimed at the institutional development of the water and sanitation sectors**

***Originator:***              Camacho

***Barrier description:***

The absence of strong leadership by the government generates a gap in institutional programs. The sectors should be directed by an institution that can establish policies at the central, departmental, and municipal (local) levels. For the implementation of sustainable policies, it is not possible to develop programs in the absence of a strong government counterpart. Standards, regulations, and technologies for the rural areas and small populations are lacking. It is important to develop the institutional capacities of government at the central, departmental and municipal levels in order to create the mechanisms necessary for the development of sustainable programs.

***Importance:***

There is a need for the establishment of an institution that will set the policies of the country and will make it possible to establish clear rules for the development of the sector and defining its priorities, objectives, legal and regulatory frameworks.

The municipalities are assuming new responsibilities through a decentralization process, but they need to develop a management system, a maintenance operations system, as well as the development and implementation of other sustainable systems.

***How to overcome the barrier:***

- Set up joint programs, in the long run, for institutional development.
- Establish long-term demonstrative programs in small municipalities, which involves a holistic approach, appropriate technology, management, education, and inter Sectoral.

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**Title:** Weakening of the central, or Sectoral levels that facilitate the realization of projects that require economies of scale on behalf of the participation or other actors of the sector, such as institutes, private enterprises and NGOs

**Originator:** Galvis

***Barrier description:***

Establishing training programs for technicians, professionals, and research investigators, offers of the private sector, etc. requires economies of scale in order to make possible its realization and cannot be done by transferring the costs to each local government or to each service provider.

***Importance:***

Without economies of scale, the realization of programs/projects that require the development of the sector is not possible. Examples are management of international credits, national budgets, research programs, training, surveillance, and control.

***How to overcome the barrier:***

Strengthen the capacity of entities at the central/sectional levels in order to promote, facilitate and finance programs/projects whose results and benefits may transcend the local level and may have international implications. This should be done without sacrificing the process of decentralizing and strengthening the participation from the local level in order to improve water and sanitation services.

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**Title:** Lack of policy and institutional development

**Originator:** Mahadew

***Barrier description:***

In the process of sectoral planning, political issues in the sector common to all parties involved should be incorporated (policymaking) and the institutions (both government and private) at each level should be involved in the operation of the drinking water service.

Without a clear drinking water supply policy, it is very difficult to supply drinking water effectively. Without professional and dynamic institutions, it is not possible to implement policies efficiently.

***Importance:***

For mobilizing internal and external resources to enhance the level and quality in the provision of the services in a sustainable manner. Possible parameters to quantify are:

- Missed investment opportunities.
- Missed donor funding.
- Cost/service coverage ratios.

***How to overcome the barrier:***

- Identify stakeholders.
- Formulate sector policies together.
- Acquire basic political commitments.
- Create an environment conducive to enabling institutions to become professional and dynamic.

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***Title:***                      **Need of institutional reinforcement**

***Originator:***              Rivera

***Barrier description:***

The public utilities or the boards of management in smaller localities are not prepared to handle administrative and/or technical issues. The political management of tariffs results in the deterioration of quality service and facilities and prevents the reinvestment in the systems.

***Importance:***

The investments made have a short life span. Soon after, it becomes necessary to devote new resources for rehabilitation, instead of using the resources to improve the system.

***How to overcome the barrier:***

The people in charge of managing the systems and the local political entities need to be trained on how to properly set prices and revenues.

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**Title:** Lack of a meaningful legislative environmental policy and regulatory reforms, compliances, and standards

**Originator:** White

***Barrier description:***

Lack of legislation in place and the implementation of that legislation reflecting policies focusing on a commitment to environmental and ecological beliefs and agendas.

***Importance:***

It is important because without a specific tangible commitment, water and sanitation agencies within that government will not have the necessary leadership, support, and direction to address the needs of their citizens. It is significant because its absence aborts master plans, strategies, funding opportunities, and general trust in a government purported to serve the people. It is also quantifiable as a reflection of specific projects not built, funding not received, devastation by diseases, and elections lost.

***How to overcome the barrier:***

Begin at the local level politically, and organize an effort to speak with the town/village/district representative who sits at the national legislative level by concretely showing that person the problems and tangible results of a lack of national policy and implementation, and the definitive water/sanitation needs of that community. Encourage this legislation to reflect community-based decision making and capacity building.

## **Absence of Local Institutions to Sustain Local Water Supply Facilities**

[Alternate Title: Absence of Local Capacity (Water Supply Utilities, Community Empowerment, etc.) for Providing for the Proper Operations and Maintenance (O&M) of Small Water Systems to Ensure Their Sustainability.]

### **ORIGINATORS:**

Okun on behalf of himself, Bartram, Grimes, Kimm, Ordóñez, and Philippeaux

### ***Barrier description:***

Even where funds are available for the construction of water supply facilities in a small community, the institution responsible for its long-term O&M often does not have the capacity to raise the funds necessary to finance O&M. Users in the community must be educated by the utility to understand that they are responsible for providing the funds.

### ***Importance:***

Without assurance of cost recovery and O&M, the water supply facility will not be sustainable.

### ***How to overcome the barrier:***

National and/or regional agencies must invest in helping build the local utility agencies that should be obliged to collect charges for water service to provide for O&M.

Local participation during the planning process and looking at the costs and problems to be faced in effective implementation will improve the likelihood of local support for effective implementation.

When external finance agencies are involved in initial finance, they should be asked to invest in building the local institutional capacity.



*The following barriers were subsumed under the previous title:*

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**Title:** New construction is favored over rehabilitation and extension

**Originator:** Bartram

***Barrier description:***

Large investments are made in small systems that then too frequently suffer gross premature failure. Improved community management, and therefore prevention of failure, should be the primary intervention. Rehabilitation and extension can be cost-effective.

Nevertheless, policy among lenders that has a strong influence upon national investment policy strongly favors new construction over rehabilitation and extension.

***Importance:***

Need to increase coverage and optimize return on investments.

***How to overcome the barrier:***

- Pressure for changes in lending and technical assistance policy among international financing institutions and bilaterals.
  - Increase interest among professionals, and especially engineers, for whom rehabilitation and extension may be low-prestige activities.
- 

**Title:** Poor performance of some existing small systems

**Originator:** Grimes

***Barrier description:***

- Simple processes are used, i.e., raw water from a surface source is just chlorinated; very robust, full treatment processes were not built with development.
- The risk of contamination is high with a parallel health risk.
- In rainy season, plants are shut down for turbidity.
- The communities develop beyond system capacity.
- Matching network size with supply source.

***Importance:***

- Many small systems constructed years ago have not been upgraded nor properly maintained. The problem can be measured by volume of water produced from rural sources.
- Water supplied on a scheduled basis.

***How to overcome the barrier:***

Re-engineer small systems using more robust, appropriate technology to provide good quality water on 24-hour basis.

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***Title:***                      **Small systems lack the management capabilities to sustain changes once introduced**

***Originator:***              Kimm

***Barrier description:***

Without a management capability, changes will not be long lived.

Options:

- Bring together a number of small systems to support central management.
- Link small to nearby larger systems to support shared management.
- Create system of “circuit riders” to provide continuing technical assistance to the improved systems.

***Importance:***

Try to measure performance over time as the effectiveness of O&M.

***How to overcome the barrier:***

- Clear goals – enhanced management needs to be the major priority throughout planning process.
  - Include training – throughout project life.
  - Promote association of small system operators.
- 

***Title:***                      **Absence of local institutions to sustain local water supply facilities**

***Originator:***              Okun

***Barrier description:***

Funds are generally available from outside sources to build water supply facilities. To sustain the operations and maintenance of these facilities requires funds that are not generally available from outside sources. The people served must be the source of funds for sustaining the system.

***Importance:***

Without overcoming this barrier, the system will disintegrate and the potential for correcting the situation will be small.

***How to overcome the barrier:***

Involve the people of the communities in the provision of the water supply system in the first place, so that they will feel “ownership” of the system and will understand that it takes money to have the system operate and be maintained. This will lead to acceptance of the need to pay for the water service on a continuing basis to sustain the system. From this background, an organization can be created. This organization can then initiate other water supply and sanitation projects.

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***Title:***                      **How to conserve an adequate and sustainable level of operation and maintenance**

***Originator***                Ordóñez

***Barrier description:***

- Administration: disorder and negligence.
- Technical aspects: incompetence.
- Financing: income that does not give sustainability.

***Importance:***

- Ensure a good service that improves health
- Do not waste investments in infrastructure.
- Conserve the credibility of the users.
- Quantify losses.

***How to overcome the barrier:***

- Involve the community.
- Give permanent training to the persons in charge.
- Have good supervision on the part of entities of the central government.
- Have sufficient rates.

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**Title:** Lack of proper and regular maintenance of small systems

**Originator:** Philippeaux

***Barrier description:***

Small systems are not properly maintained and often are not adequately operated causing breakdowns and inoperation. Problems of spare parts, killed operators, and lack of involvement by resident communities are usually the cause.

***Importance:***

The life span of the system is reduced – affects quality of the water.

***How to overcome the barrier:***

- Strategy, resources required, skills of operators, plans of operation, role of community must be considered during the planning stage – if to ensure sustainability of small systems.
- Local authorities must take a stake in the management of small systems. They need to constantly monitor the small systems and allocate technical and financial resources for emergency repairs.

## **Absence of Commitment from Decision Makers on Appropriate Socio-Economic Development and the Establishment of Policies Strengthening Institutions, Programs, and Projects**

### **ORIGINATORS:**

Rivera on behalf of himself, Abreu, Camacho, Gómez, Mahadew, Mejía, and Philippeaux

*The following barriers were subsumed under the above title:*

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**Title:** Major problems, large decisions

**Originator:** Rivera

### ***Barrier description:***

The principal barrier that developing countries face is the lack of political will from their government to confront the challenge of providing water to its populations, whether these are large, medium or small. Once a decision is made, the necessary level of investment and the sources of financing will depend on the desired degree of coverage, the magnitude of the population, the geography of the territory, the availability of water and its sources.

Without a political decision at the highest levels of government, the rest of the barriers become more critical.

### ***Importance:***

Without a decision by government, the measures that are necessary to be taken, beginning with financial considerations, cannot be channeled toward the sanitary area. A socioeconomic study, which evaluates the impacts on the populations not having the water supply or having a deficient service, can point out the desirability of placing financial resources for this purpose.

***How to overcome the barrier:***

Well-oriented studies can raise the awareness of the people who should make political decisions.

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***Title:***                      **Lack of clear and up-to-date policies to direct and prioritize actions in small systems**

***Originator:***              Abreu

***Barrier description:***

The recommendations made in different fields to help countries (specially the poorest) to provide water to all the people residing in small communities are generally applied in a punctual and partial way and not with the serious commitment that a national policy could provide.

***Importance:***

Without adequate policies, it would economically impossible to provide safe drinking water to the majority of people who reside in small communities because:

- It limits the ability of countries to do more with their available economic and human resources.
- It limits the ability to attract financial resources.
- The objective of providing safe drinking water is not prioritized at the national or local levels.
- A change of government can not alter existing plans.

***How to overcome the barrier:***

- Increase the awareness of the politicians on the advantages of developing adequate policies for providing safe water.
- Design and enforce technical standards.
- Create and/or strengthen regulatory agencies responsible for developing and monitoring policies applicable to providing safe drinking water to the majority of residents in small communities.

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***Title:***                    **Lack of policies aimed at the institutional development of the water and sanitation sectors**

***Originator:***            Camacho

***Barrier description:***

The absence of strong leadership by the government generates a gap in institutional programs. The sectors should be directed by an institution that can establish policies at the central, departmental, and municipal levels. For the implementation of sustainable policies, it is not possible to develop programs when there does not exist a strong counterpart with governments. Standards, regulations, technologies for the rural area and small populations are lacking. It is important to develop the institutional capacities of the government at the central, departmental, and municipal levels in order to create the mechanisms necessary for the development of sustainable programs.

***Importance:***

There is a need for the establishment of an institution that will set the policies of the country and will make it possible to establish clear rules for the development of the sector and defining its priorities, objectives, legal and regulatory frameworks.

The municipalities are assuming new responsibilities through a decentralization process, but they need to develop a management system, a maintenance operations system, as well as the development and implementation of other sustainable systems.

***How to overcome the barrier:***

- Set up joint programs, in the long run, for institutional development.
- Establish long-term demonstrative programs in small municipalities, which involves a holistic approach, appropriate technology, management, education, and intersectoral.



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**Title:** Current restrictions to provide drinking water through small systems or community systems

**Originator:** Gómez

***Barrier description:***

This barrier or restriction is a socioeconomic issue whereby small communities are unable to carry the cost burdens of providing community drinking water systems.

***Importance:***

Capital investments, institutional development, as well as modifications in the activities, practices, and knowledge of the community are necessary to strengthen the political will that undoubtedly requires resources, effort, and time.

***How to overcome the barrier:***

- Strengthen the political will of each country through the formulation of institutional mechanisms to cause change at the highest political levels (governments).
- Need for training and strategies to carry out the activities of the sector in each country.
- Develop community development programs.

All this will raise the level of awareness of the political and local communities to the importance of education, organization, and attention to vulnerable bodies in order to achieve sustainable solutions.

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**Title:** Lack of policy and institutional development

**Originator:** Mahadew

***Barrier description:***

In the process of sectoral planning, political issues in the sector common to all parties involved should be incorporated (policymaking) and the institutions (both government and private) at each level should be involved in the operation of the drinking water service. Without a clear drinking water supply policy, it is very difficult to supply drinking water effectively. Without professional and dynamic institutions, it is not possible to implement policies efficiently.

***Importance:***

For mobilizing internal and external resources to enhance the level and quality in the provision of the services in a sustainable manner. Possible parameters to quantify are:

- Missed investment opportunities.
- Missed donor funding.
- Cost/service coverage ratios.

***How to overcome the barrier:***

- Identify stakeholders.
- Formulate sector policies together.
- Acquire basic political commitments.
- Create an environment conducive to enabling institutions to become professional and dynamic.

---

***Title:***                      **Lack of continuity in programs and projects**

***Originator:***              Mejía

***Barrier description:***

For political/partisan reasons, a change in government could result in the lack of continuity of programs and projects.

***Importance:***

There is no assurance that a program or project will be fully implemented.

***How to overcome the barrier:***

Financing agencies or banks should require continuity of projects they fund.

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***Title:***                      **Failure in some developing countries of appropriate socio-economic and political development**

***Originator:***              Philippeaux

***Barrier description:***

Water services are part of the social and economic development of a community. The insufficient share and consideration of central government in the allocation of resources constitute a major barrier for development of small systems.

***Importance:***

One-and-one-half billion people in the world are without access to safe drinking water simply because of the lack of priority of social issues by politicians and inequity in the distribution of resources among the different sectors.

***How to overcome the barrier:***

Promote democracy in developing countries.

## **Failure to Create Capability Among the Various Partners to Cooperate Effectively in the Delivery of Environmental Health Services in a Holistic Manner**

**ORIGINATORS:**

Austin on behalf of himself and Lima

*The following barriers were subsumed under the above title:*

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**Title:** Lack of creating capability among municipalities, elected officials, NGOs, and communities to work as effective partners to carry out environmental health services

**Originator:** Austin

***Barrier description:***

Lack of involvement in the community by national, provincial, and municipal officials in carrying out risk analyses, analyzing problems, forming policy decisions, focusing of resources, and carrying out environmental health solutions.

***Importance:***

Improving communications, developing analytical skills, establishing initial trust are paramount in implementing appropriate solutions to develop ownership by the community.

Decades of top down implementations have shown a lack of ownership by communities. This process will develop: an acceptable approach by all parties to carry out environmental health projects, trust by all parties, and demonstrated ownership by the community leading to sustainability. Performance indicators can be developed to monitor and measure progress of the work plan.

***How to overcome the barrier:***

Behavioral changes are needed by all levels to develop effective partnerships. This can be accomplished through:

- Assessing the problem; developing a vision and a work plan.
  - Carrying out skill-building workshops.
  - Following up and monitoring activities.
  - Carrying out policymaker roundtables.
  - Implementing micro projects.
  - Scaling up to other communities.
- 

***Title:*** Lack of an integrated approach that coordinates the needs of the different sectors (governments, aid agencies, NGOs, and communities)

***Originator:*** Lima

***Barrier description:***

While the State recognizes the necessary changes in its role (paternalistic), the community often continues to demand solutions that the state by itself cannot provide.

***Importance:***

The unrealistic expectations and the lack of coincidence in the solutions aggravate the ability to resolve this barrier.

***How to overcome the barrier:***

- Harmonize the needs of the sectors to prevent tension or conflict situations.
- Negotiate.

## **Non-Availability of Timely Investment-Type Funding**

### **ORIGINATORS:**

Grimes on behalf of himself, Hofmeyr, Lima, Rivera, and Treasure

*The following barriers were subsumed under the above title:*

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**Title:** Non-availability of timely investment-type funding

**Originator:** Grimes

### ***Barrier description:***

#### The barriers:

- The economics of developing small systems vs. more effective larger systems.
- Funding for small systems development competes with other sectors.
- Recurrent vs. capital expenditure is a contentious issue.
- Cost benefit is a critical question.
- Lending agencies need to establish systems for funding.

#### The barriers' importance:

- No new system limits the level of service possible.
- Water supply scheduling with its attendant problems would continue.
- Customer dissatisfaction, etc.

***Importance:***

- Lack of funding or investment reduces the level of service in terms of quality and quantity. Twenty-four-hour service is not achieved; only scheduled service, especially in rural communities, is available.
- It could be that revenue might be lost, because the number of customers is not expanded.
- Company's image/performance deteriorates. Field monitoring and market surveys are good indicators.
- Delayed decisions can translate into increased cost. Revised project costs are normally higher due to inflation.

***How to overcome the barrier:***

- Establish a "small system" development fund with a clear project-type approach in keeping with funding agencies guidelines.
- Utilize a "Self Help" approach, which is a community-based approach and can be coordinated by an agency.

---

***Title:***                      **Accessing finance**

***Originator:***              Hofmeyr

***Barrier description:***

Individual towns or groups of towns (as para-statal organizations) have difficulty borrowing at decent interest rates, even if a commercial loan is desired for a well-defined project and is affordable.

***Importance:***

Without finance, towns or groups of towns rely on state organizations that have shown incompetence and inefficiencies.

***How to overcome the barrier:***

Lobby World Bank/International Monetary Fund to remove the restrictions which prevent suppliers from establishing medium-term finance. This applies particularly to the prohibition of acceptance of other debt, apart from the loans that they may have approved.

---

**Title:** Lack of sustainable financial and economic base to provide drinking water to 100% of the population

**Originator:** Lima

**Description:**

When a government's economic balance is altered, it becomes unfavorable for technical proposals to receive support especially when the cost/benefit ratios are not adequate.

**Importance:**

Governments that have economic and financial constraints on their resources may choose to support programs that have a better cost/benefit ratio and that can complement other social programs. The result is that priorities placed on programs that support providing water supplies to small populations are reduced or eliminated.

**How to overcome the barrier:**

The government, cooperative agencies, NGOs, and/or the community may be capable of providing sustainability to the drinking water supply by improving the social infrastructure and by connecting technical issues with social issues.

---

**Title:** Without well-structured projects, it is very difficult to obtain financing

**Originator:** Rivera

**Barrier description:**

Experience has shown that when infrastructure projects are not well structured and complete, it is almost impossible to secure financing. Countries and multilateral agencies that are willing to financially support projects will require that the projects contain feasibility studies to justify the financial investment.



***Importance:***

This barrier is significant to the extent that is a general requirement to obtain the financial resources for improving the infrastructure of the institutional reinforcement.

***How to overcome the barrier:***

Assign a portion of the financial resources to the preparation of feasibility studies that would point out the critical areas to be addressed.

---

***Title:*** Direct financing to small communities

***Originator:*** Rivera

***Barrier description:***

Every infrastructure project requires financing, whether it is reimbursable or not. It therefore becomes necessary to create procedures that will allow small communities to have access to financial resources.

***Importance:***

Community participation, through its requirements and its own projects, can make it possible for small communities to receive local financing from government resources or from multilateral entities. It is necessary that the technologies to be applied are compatible with the way in which the projects will be carried out without discarding the most recent technology that can be utilized.

***How to overcome the barrier:***

Create organizations that are in agreement with the reality of each country and that can manage the financial resources available to a project based on a socio-economic evaluation conducted by an organization's work committee. In some cases, loans will be issued on a non-reimbursable basis; in other cases, loans will be repaid in full.

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***Title:*** Little understanding of "community reality" by lending agencies

***Originator:*** Treasure

***Barrier description:***

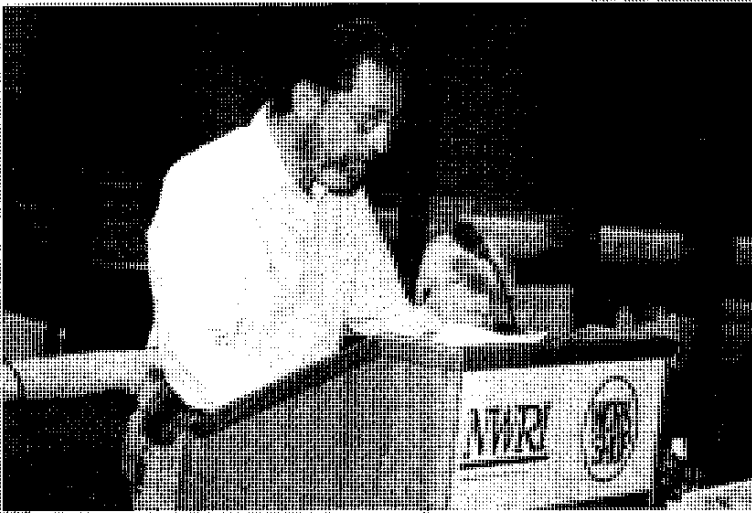
Agencies have taken few examples of community problems and have stereotyped the situation bringing an oversimplified opinion.

***Importance:***

The approach is a recipe for failure. The number of programs or systems that are non-functional can quantify it.

***How to overcome the barrier:***

It is important that locally based officers of the funding agencies try to integrate to the culture rather to mingle around the diplomatic core. The missions that visit the countries need to listen to the local knowledge.



## **Lack of Awareness Among Politicians, Decision-Makers, and the Local Community**

### **ORIGINATORS:**

Solsona on behalf of himself, Hofmeyr, Jiggins, Kimm, and Treasure

*The following barriers were subsumed under the above title:*

---

**Title:** Lack of awareness among politicians, decision-makers, and the local community

**Originator:** Solsona

### ***Barrier description:***

Politicians and decision-makers underestimate the power of basic sanitation when related to welfare and growth for their people (country). On the other hand, people do not understand the relationship between disease and unsafe water. People will complain of chlorine taste and odors not understanding that a more tasty water may produce illness.

### ***Importance:***

If politicians do not understand the potential significance of providing safe water (and sanitation) for the country, they will not commit to political decisions for implementing safe drinking water programs. If the people are not aware, they can not exert pressure on the political bodies for implementation of these programs.

### ***How to overcome the barrier:***

Massive education (at all and every level); communication by all possible ways; discussions at every level.

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**Title:** Collecting revenue from sales of water

**Originator:** Hofmeyr

***Barrier description:***

In small schemes, people may use only approximately 25 l/day each. For example, if \$1.50/m<sup>3</sup> is a realistic target price, this means collecting less than \$0.04 per person per day.

***Importance:***

If you cannot collect the money, you cannot service the loan or pay for O&M and depreciation. Flat fees lead to wastage.

***How to overcome the barrier:***

Find efficient ways to collect revenue and make these an integral part of water supply projects.

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**Title:** The lack of public perception that clean water supplies are not necessarily safe water supplies

**Originator:** Jiggins

***Barrier description:***

The barrier is the general perception that a clear water supply is probably safe to drink. While problems of taste or discoloration may be unpleasant to consumers, they do not correlate with the presence of any microbiological contamination. The organisms, which cause illness, are not detectable by consumers who largely assume that if they receive a piped water supply, it is safe to drink.

***Importance:***

The barrier is important because many people do not identify the association between microbiological contamination of water supplies and illness. Often they may consider that a discolored water supply to be contaminated and a potential hazard, while such episodes are unlikely to be associated with significant microbiological contamination. The fact that most current microbiological methods cannot be used in field situations and take 24 hours to complete also hinders the rapid detection of microbiological contamination.

***How to overcome the barrier:***

The barrier can be largely overcome by public education on water supply issues. Consumers of small supplies should be given appropriate information regarding the security of supplies. Where the quality of small water supplies cannot be assured, the consumers must be made aware and given appropriate advice on how to make such supplies safe.

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***Title:***                    **Lack of understanding among the population served by the water supply system of the linkages between drinking water quality, sanitation, and public health risks**

***Originator:***            Kimm

***Barrier description:***

Until the population served understands the health benefits of improved services, they are unlikely to support needed changes.

***Importance:***

Mobilizing community interest, especially among women, is key to creating the “political will” to press for needed improvements.

***How to overcome the barrier:***

All investments need to include effective public education of the community, especially women, and are tied to data such as estimates of outbreaks of disease or death rates among children, etc.

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***Title:***                    **Elimination of the social perception that a small system represents to community members a lower status in society - sign of marginalization**

***Originator:***            Treasure

***Barrier description:***

A pipe water system coming from a modern treatment facility is perceived as a sign of development and status. It also provides assurance and confidence on the quality of the water produced. This perception has made difficult the implementation of rainwater catchments/systems as means of adequate water supply. Communities do not believe that individual systems are indicators of good social status – they see themselves as marginalized by society.

***Importance:***

Communities are depriving themselves from access to water.

The cost of aborting an on-site system or a community rainwater catchment can result in tremendous capital expenses that cannot be covered by our ill economies.

***How to overcome the barrier:***

Perception is sometimes difficult to change, and in many instances is not politically prudent to do it (as the concept “fix your roof and collect water from the rain” does not make a politician popular). First, technical groups need to be convinced that there are other options for safe water apart from the one that comes from a conventional/package plant. This needs to be explained to the politicians and community leaders in order to obtain attention which will be transformed in a serious community involvement.

It might happen that a good successful project would be a good example for replicability.



## **PRIORITY 7**

# **Lack of a Permanent Organization That Monitors and Provides Technical Assistance to the Communities That Administer Their Water System**

### **ORIGINATORS:**

Ramos on behalf of himself, Bartram, Galvis, and González

*The following barriers were subsumed under the above title:*

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**Title:** Lack of a permanent agency to monitor and provide technical assistance to the communities that administer their water system

**Originator:** Ramos

### ***Barrier description:***

When construction of a water system is completed, the implementing agency withdraws from the project. The community is then responsible for administering the system without support when technical problems arise. The result is the deterioration of the system.

### ***Importance:***

Although the system may have been constructed utilizing appropriate technology and may have had community participation in all phases of its implementation, failure will occur with time because of the lack of support from an entity that could provide technical and/or administrative assistance.

### ***How to overcome the barrier:***

- Increase the responsibilities of municipalities or create decentralized organizations to ensure that water systems that are constructed are sustainable.
- Encourage community participation to generate a feeling of ownership of the system and to diminish the requirement for technical and economic assistance.



- Require agencies that financed the construction of water and sanitation systems to include a monitoring period in order to diminish the later need for assistance.

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***Title:***                      **Support systems for community management**

***Originator:***              Bartram

***Barrier description:***

The defining characteristic of small or community systems is that they are operated, managed, and administered by community members who may be untrained and/or unpaid. Improved management of community supplies is the critical limiting factor, but the necessary resources are rarely available within communities. Systems for provision of certain resources to community management are therefore essential. Only two models for such support exist: private sector management (i.e., management external to the community) and public sector (governmental) support structures to communities themselves.

***Importance:***

The rate of failure of small supplies is high across the globe, and this is a major limiting factor. If grossly premature failure is assumed to occur in around 80 percent of systems, if improved community management could have ameliorated 80 percent of cases, and if support systems to community management could have contributed to significantly reduce/prevent failure in 80 percent of cases, then some indication of importance can be estimated.

***How to overcome the barrier:***

There are major political impediments to expanded governmental activity in water supply, but case studies of effective support do exist. Improved recognition of and support for the specific role of government (whether direct or indirect) is required.

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**Title:** Lack of independent organizations (e.g., Association of Service Providers) that represent and facilitate the management (public and private entities, NGOs) of small systems

**Originator:** Galvis

***Barrier description:***

This barrier is of a sociopolitical nature. The need for independent organizations surpasses the need to manage relevant activities provided in different phases of a project's cycle. For example, access to financing and co-financing; consensus building on information needs (legal, technical, teaching, etc.); and administrative support or technical assistance.

***Importance:***

Such an organization would improve communications and consensus building among service providers. The number of associates in the organization, publications, training classes, and number of contracts with the public and private sectors and NGOs could quantify the importance of an Association of Service Providers.

***How to overcome the barrier:***

- Investigate similar organizations in other countries and disseminate information gathered.
- Promote professional membership in the organization.

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**Title:** Lack of a regulatory agency that can solve problems and support rural communities

**Originator:** González

***Barrier description:***

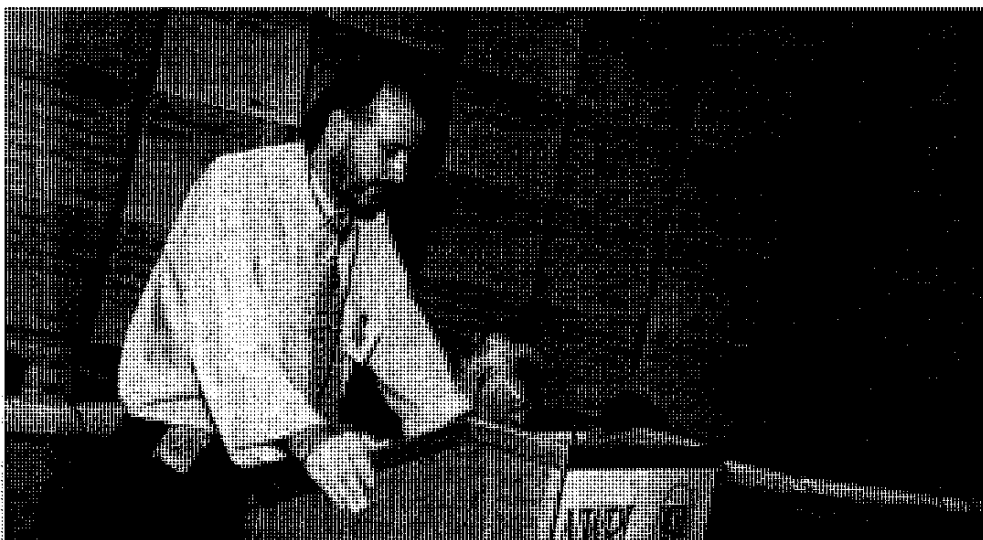
Lack of access roads to support small communities with drinking water systems.

***Importance:***

Many communities without access roads also lack communication systems, commerce, etc.

*How to overcome the barrier:*

- Raise government awareness so that solutions to these problems can be sought.
- Encourage donor agencies that support drinking water supplies to allocate additional funds to help overcome this problem.



## **Imposition of Programs and Projects to Be Implemented in the Community Without Considering This a Developing Subject**

**ORIGINATORS:**

White on behalf of himself, Galvis, Hernández, and Lima

*The following barriers were subsumed under the above title:*

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**Title:** Lack of a community-based component in the funding/donor application/approval process

**Originator:** White

***Barrier description:***

Recognition by funding agencies and donors that community participation at every decision-making step is critical. If affordability is to be seriously considered, and appropriate technology sought, and sustainability a real goal, then the recent proposal by the World Bank to underscore a demand responsive approach (community choice and voice) should become a criteria in the application/approval procedures. The community-based approach should be synchronized as an agreement among the major bilateral funders. If this approach does not become a major funding criteria, then business will continue as usual ( i.e., high costs, inappropriate technology, and sustainability lost).

***Importance:***

This is important because without a community-based approach, expensive, inappropriate projects will be built and not sustainable. Also, willingness to pay and cost recovery will become a problem if the community did not make the initial decisions.

***How to overcome the barrier:***

Initiate meetings and possible memorandums of agreement among major donors/funding agencies that could have a requirement or at least priorities regarding the necessity of community driven choices and decisions.

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***Title:***                      **Limitations of technically- and professionally-trained personnel to implement the principles of a demand responsive strategy (i.e., Dublin Fresh Water Conference, 1992)**

***Originator:***              Galvis

***Barrier description:***

Without duly-trained promoters and facilitators, it will be difficult to accomplish true participation at the local level. Consensus-building will be difficult, and the quality of available information will be impacted.

***Importance:***

The work of the facilitator or the staff member involved on the program is key in order to enrich the decision-making process throughout the cycle of the project. It can be quantified indirectly, based on sustainability evaluations of the systems versus the facilitation or technical assistance during the process.

***How to overcome the barrier:***

- Provide training programs for technical and professional staff to learn the principles of a demand responsive strategy.
- Use an interdisciplinary approach for training (technical, socioeconomic, etc.).

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***Title:***                      **Projects and programs imposed upon a community**

***Originator:***              Hernández

***Barrier description:***

Many projects are designed by an agency for development in a particular community. However, other locations may have a greater need and may be in a better position to participate. These projects are often developed over short periods of time and without regard to mobilization of financial and human resources, education and training, etc.

***Importance:***

To be successful, the community must be involved in the planning phase to sustain greater social participation.

It is important to devote the necessary time to develop awareness at the institutional and community level in order to achieve appropriate project execution.

***How to overcome the barrier:***

- Establish mechanisms within a community that will make it possible to identify and prioritize the sanitary problem for them with institutional support.
  - Set up a process whereby a community can generate funds for the project.
- 

***Title:*** Not to consider the community as a subject of development

***Originator:*** Lima

***Barrier description:***

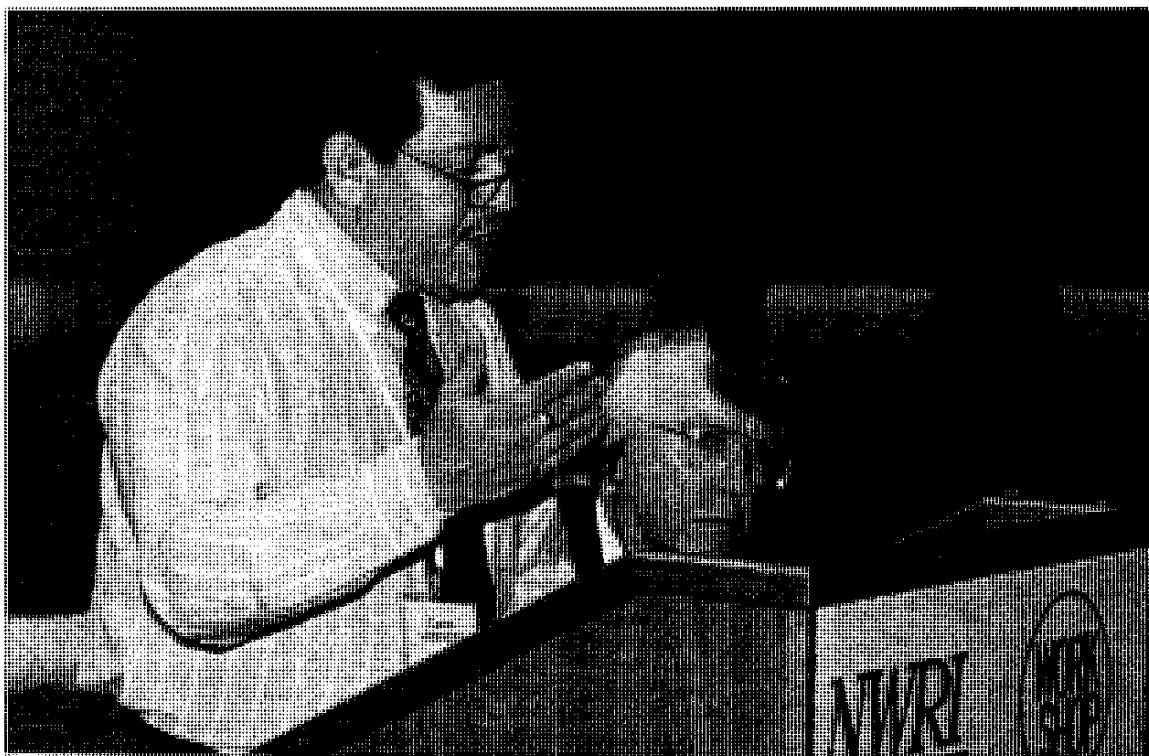
The community continues being considered, often, as the subject of development. They continue applying programs that do not count on social participation as management of social politics. (Operating in the identification of its problems and possible solutions, choosing the one of greater acceptance, and committing themselves in implementing, managing, and evaluating the process.)

***Importance:***

The importance is given by the absence of social participation in the management of its own development, which affects the strength of these processes directly.

***How to overcome the barrier:***

Find ways that make social participation possible and the taking of conscience on the part of the individuals and communities, so that they move from “beneficiaries” (passive subjects of social politics) to “clients” (active subjects who exercise their rights) that are committed to the processes that involve them.



# **Lack of Appropriate Technology Solutions**

## **ORIGINATORS:**

Solsona on behalf of himself, Hartzell, Jiggins, Landman, Mejía, and Morales

*The following barriers were subsumed under the above title:*

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**Title:** Lack of appropriate technology solutions

**Originator:** Solsona

### ***Barrier description:***

The use of first world technology in the third world has already proved to be disastrous. If people do not accept (from a cultural point of view) a certain technology, the technology will be doomed to failure. The new technology will be used only until its first breakdown. Then no one will want to “understand and fix it,” and the broken unit will continue to be broken.

### ***Importance:***

There always should be a link between technology and the culture belonging to the people using that technology. Appropriate technology refers not to a mechanical device but to a mixture of cultures, economics, politics, affordability, willingness to use and to pay, etc., where the engineering is only one (perhaps small) part of the total.

### ***How to overcome the barrier:***

- Exchange information.
- Promote congress, events, and courses in appropriate technology.
- Search for, individualize, gather, homogenize, make the information ready for use and distribution.
- Market the technology.
- Do appropriate technology transfer.



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**Title:**                      **Lack of awareness and education about currently available treatment options**

**Originator:**              Hartzell

***Barrier description:***

A significant barrier to providing safe drinking water is the lack of education and awareness of available technology options. Project designers and planners must be informed and educated about the wide variety of treatment options so they can make the best possible selection.

***Importance:***

Without knowledge of the best available and most appropriate technology for a specific application, inappropriate decisions will be made which will result in poor implementation and early failure.

***How to overcome the barrier:***

A way to overcome the educational barrier is to generate and distribute a comprehensive resource directory of currently available treatment options independently reviewed and categorized by application appropriateness, treatment effectiveness, energy source, initial cost, operating cost, repair and maintenance requirements, and volume production.

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**Title:**                      **The lack of provision of appropriate treatment in many small water systems**

**Originator:**              Jiggins

***Barrier description:***

The barrier is the result of a previous long-term focus on the requirements of the needs of the higher proportions of people who are supplied by large water systems. Many small water systems have no treatment provision. The difficulties and expense of assessing the water quality and need for treatment in small water supplies have given it a low priority in terms of funding.

***Importance:***

The barrier is significant because it has been demonstrated that appropriate treatment can be effective in providing satisfactory water quality from small water systems providing it is appropriate with correct operations and maintenance. It is very difficult to quantify the barrier, although the numbers of small water supplies that receive treatment may be estimated; the extent to which they produce satisfactory water quality will depend on the provision of adequate monitoring data.

***How to overcome the barrier:***

- A stronger commitment to provide improved support for the operation of small water systems.
- Improved assessment of small systems should ensure that appropriate treatment provision is made.
- Treatment needs to be appropriate if there is to be confidence that a groundwater source is well protected and of very good quality – there may be no need for treatment.
- Sources with very low levels of contamination may be effectively protected by chlorination.
- Sources with significant levels of contamination require additional treatment.

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***Title:*** Reluctance to apply advanced technology capable of treating water reliably and cost effectively with reduced operator responsibility

***Originator:*** Landman

***Barrier description:***

Although we desire advanced technical solutions to address contaminated water supplies, we have a natural tendency to fear both the effectiveness and reliability of unfamiliar advanced treatment and systems control technologies. As a result, we tend to view “appropriate technology” as that which is most reflective of existing infrastructure or fits in most smoothly with existing infrastructure and levels of technical sophistication and capacity. This may occur although we may recognize the inadequacy of the existing level of infrastructure and capacity at an application site.

***Importance:***

Without overcoming this barrier, change and advancements will occur much more slowly than otherwise possible.

***How to overcome the barrier:***

Maximizing progress may require movement beyond pre-existing comfort zones in areas of design, application and control of treatment technologies. These advancements may require shifts in interpretation of “appropriate technology” in light of radical changes in cost and reliability of treatment and control technologies.

---

***Title:*** Non-use of appropriate technology in the construction of systems

***Originator:*** Mejía

***Barrier description:***

Sophisticated systems are being constructed in small communities in lieu of small systems that would be just as adequate and would provide greater coverage for small communities.

***Importance:***

The costs of constructing a sophisticated system could be used to construct several small systems. The operation and management of a small system would be more appropriate for a small community.

***How to overcome the barrier:***

- Change the approach to decision-making and project design through better communication, education, and information exchange with the community
- Include research, analysis, plans of actions, monitoring, pilot projects, prioritization, and community participation as part of the planning and implementation processes of a program.

---

**Title:** Insufficient processes to promote alternative technologies in the countries and in the region

**Originator:** Morales

***Barrier description:***

A shortage of water service to small populations has adverse health effects. This situation can be improved by the use of:

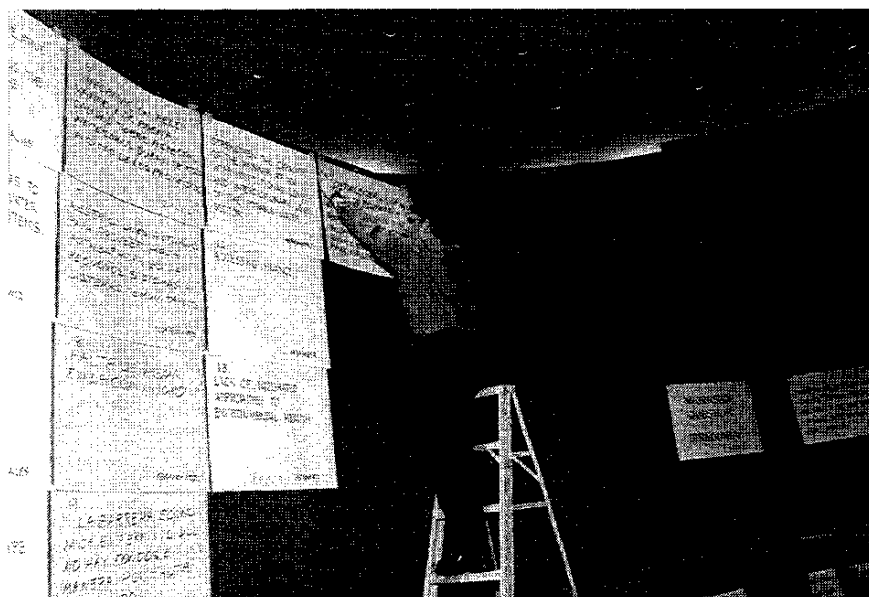
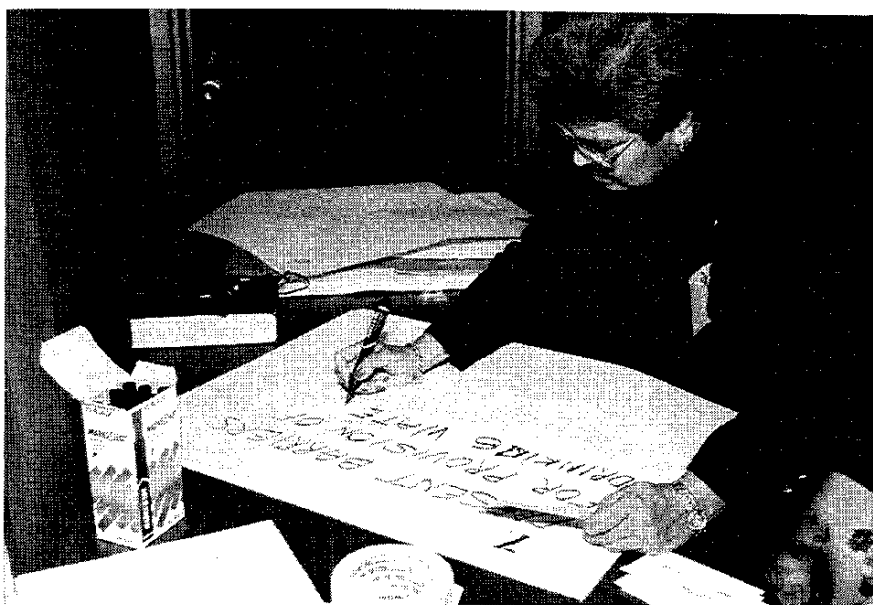
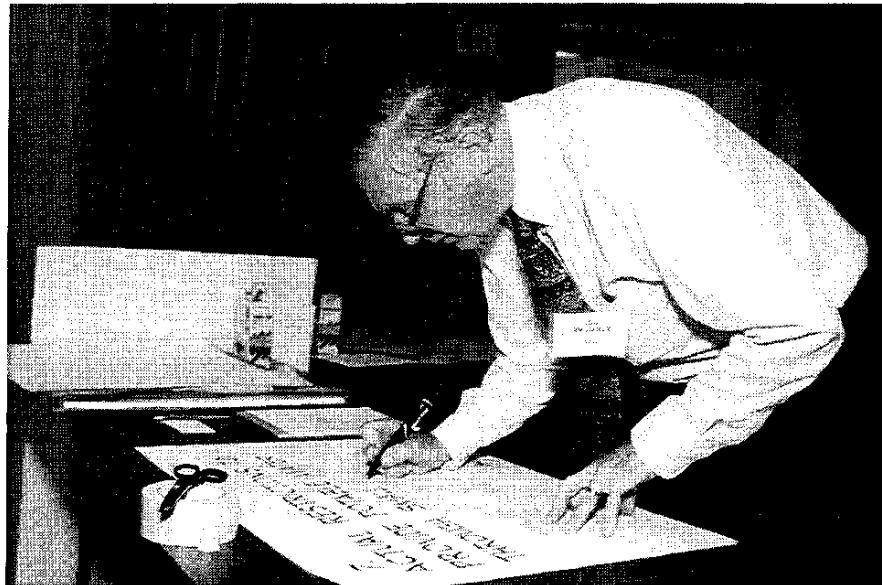
- Conventional technologies that provide definite solutions. These, however, are expensive but meet long-term needs.
- Alternative technologies that provide definite solutions that are equally as efficient as conventional technologies but cost less and meet short- and medium-term needs. Due to the low availability of financial resources, the option to use alternative technologies at the country level becomes evident.

***Importance:***

- Technological: Permits human resources development and “manageable” and sustainable technological packages.
- Political: Promotes the establishment of clear guidelines for the development of policies, strategies, programs, and projects to supply safe water.
- Social: Reduces adverse health effects (important contributor) and permits the development of the principle of “empowerment.”
- Economical: Provides broad coverage and better quality of water at lower costs. Promotes the investment of the community, the local and national governments, and the international communities in the project.

***How to overcome the barrier:***

- Establish horizontal cooperation between countries.
- Form strategic alliances between countries and regional agencies in order to promote the transfer of alternative technologies and to delineate regional and national responsibilities.



## **Capacity of Payment of the Beneficiary**

### **ORIGINATORS:**

Orozco on behalf of himself, Grimes, Hofmeyr, Howard, and Lima

*The following barriers were subsumed under the above title:*

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**Title:** Payment capacity from beneficiary

**Originator:** Orozco

### ***Barrier description:***

Small, scattered communities lack a large number of users and sufficient revenue streams that would permit a recovery of their investments or the ability to sustain the costs necessary for operation and maintenance of the system.

### ***Importance:***

- Hinders access to banking credit.
- Limits the level of technology used in the system because of an inability to repay.
- Endangers the sustainability of the system.

### ***How to overcome the barrier:***

- Increase community participation in all phases of developing the system.
- Improve opportunities to generate revenue through comprehensive integrated planning.

---

***Title:***                      **Non-availability of timely investment-type funding**

***Originator:***              Grimes

***Barrier description:***

The barriers:

- The economics of developing small systems vs. more effective larger systems.
- Funding for small systems development competes with other sectors.
- Recurrent vs. capital expenditure is a contentious issue.
- Cost benefit is a critical question.
- Lending agencies need to establish systems for funding.

The barriers' importance:

- No new system limits the level of service possible.
- Water supply scheduling with its attendant problems would continue.
- Customer dissatisfaction, etc.

***Importance:***

- Lack of funding or investment reduces the level of service in terms of quality and quantity. Twenty-four-hour service is not achieved; only scheduled service, especially in rural communities is available.
- Revenue could be lost because the number of customers is not expanded.
- A Company's image/performance deteriorates. Field monitoring and market surveys are good indicators.
- Delayed decisions can translate into increased cost. Revised project costs are normally higher due to inflation.

***How to overcome the barrier:***

- Establish a “small system” development fund with a clear project-type approach in keeping with funding agencies guidelines.
- Utilize a “Self Help” approach, which is a community-based approach and can be coordinated by an agency.

---

***Title:***                      **Accessing finance**

***Originator:***              Hofmeyr

***Barrier description:***

Individual towns or groups of towns (as para-statal organizations) have difficulty borrowing at decent interest rates, even if a commercial loan is desired for a well-defined project and is affordable.

***Importance:***

Without financing, towns or groups of towns rely on state organizations that have shown incompetence and inefficiencies.

***How to overcome the barrier:***

Lobby World Bank/International Monetary Fund to remove the restrictions which prevent suppliers from establishing medium-term finance. This applies particularly to the prohibition of acceptance of other debt, apart from the loans that they may have approved.

---

***Title:***                      **Payment structures for water supplies in low-income areas are contrary to spending patterns**

***Originator:***              Howard

***Barrier description:***

Many tariff systems are contrary to the spending patterns of the rural and urban poor who cannot guarantee that lump sums of money will be available to pay connection fees or usage tariffs. This therefore restricts the ability of the poor to afford improved water systems. Willingness and ability to pay studies often ignore that the main issue for the poor may be how they are asked to pay, not just the amount they are asked to pay.



***Importance:***

The requirement for lump sum payments is a major constraint for rural and urban low-income communities in buying into piped water supplies. This leads to usage of other, often less safe, sources leading to increased health burdens. This is also important when addressing equity of supply and inequalities in health – this will have long-term cost implications for health services and social tensions.

***How to overcome the barrier:***

This barrier may be overcome through more flexible payment systems, which allow payment of connection fees through installment and more frequent payments of lower sums for tariffs. Also, by allowing users to be actively involved in tariff setting and considering the provision of social safety nets to ensure basic minimum services are received are two key approaches to overcome this barrier.

---

***Title:***                      **Lack of sustainable financial and economic base to provide drinking water to 100% of the population**

***Originator:***              Lima

***Description:***

When a government's economic balance is altered, it becomes unfavorable for technical proposals to receive support especially when the cost/benefit ratios are not adequate.

***Importance:***

Governments that have economic and financial constraints on their resources may choose to support programs that have a better cost/benefit ratio and that can complement other social programs. The result is that priorities placed on programs that support providing water supplies to small populations are reduced or eliminated.

***How to overcome the barrier:***

The government, cooperative agencies, NGOs, and/or the community may be capable of providing sustainability to the drinking water supply by improving the social infrastructure and by connecting technical issues with social issues.

## **Availability of Relevant and Good Quality Information During the Entire Cycle of the Projects**

### **ORIGINATORS:**

Galvis on behalf of himself, Bartram, Hartzell, Landman, and Morales

*The following barriers were subsumed under the above title:*

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**Title:** Relevant and good quality information on necessary aspects during the cycle of projects

**Originator:** Galvis

### ***Barrier description:***

This barrier is of a cross-sectional nature; that is to say, it has to do with all dimensions of the subject. Without relevant and good quality information, decision making in the cycle of projects becomes difficult and increases the risk of failing.

### ***Importance:***

It is important to facilitate and describe the processes of agreement and decision making at all levels. A project can be quantified by the number of publications, particularly those reviewed by independent personnel and with critical ability in the subject at hand; units of documentation or technical assistance and number of consultants (direct, telephone, internet, etc.) to units of documentation or specialized centers of research and development and transference of knowledge to the service of the sector.

### ***How to overcome the barrier:***

- Stimulate and enrich the ability of documentation and critical spread of relevant experiences.

- Update curriculum to incorporate new concepts and opinions for the smaller systems.
  - Stimulate and support applied investigation and correspond its spread and application.
- 

***Title:***                      **Support systems for community management**

***Originator:***              Bartram

***Barrier description:***

The defining characteristic of small or community systems is that they are operated, managed, and administered by community members who may be untrained and/or unpaid. Improved management of community supplies is the critical limiting factor, but the necessary resources are rarely available within communities. Systems for provision of certain resources to community management are therefore essential. Only two models for such support exist: private sector management (i.e., management external to the community) and public sector (governmental) support structures to communities themselves.

***Importance:***

The rate of failure of small supplies is high across the globe, and this is a major limiting factor. If grossly premature failure is assumed to occur in around 80 percent of systems, if improved community management could have ameliorated 80 percent of cases, and if support systems to community management could have contributed to significantly reduce/prevent failure in 80 percent of cases, then some indication of importance can be estimated.

***How to overcome the barrier:***

There are major political impediments to expanded governmental activity in water supply, but case studies of effective support do exist. Improved recognition of and support for the specific role of government (whether direct or indirect) is required.

---

**Title:** Lack of awareness and education about currently available treatment options

**Originator:** Hartzell

***Barrier description:***

A significant barrier to providing safe drinking water is the lack of education and awareness of available technology options. Project designers and planners must be informed and educated about the wide variety of treatment options so they can make the best possible selection.

***Importance:***

Without knowledge of the best available and most appropriate technology for a specific application, inappropriate decisions will be made which will result in poor implementation and early failure.

***How to overcome the barrier:***

A way to overcome the educational barrier is to generate and distribute a comprehensive resource directory of currently available treatment options independently reviewed and categorized by application appropriateness, treatment effectiveness, energy source, initial cost, operating cost, repair and maintenance requirements, and volume production.

---

**Title:** Reluctance to apply advanced technology capable of treating water reliably and cost effectively with reduced operator responsibility

**Originator:** Landman

***Barrier description:***

Although we desire advanced technical solutions to address contaminated water supplies, we have a natural tendency to fear both the effectiveness and reliability of unfamiliar advanced treatment and systems control technologies. As a result, we tend to view "appropriate technology" as that which is most reflective of existing infrastructure or fits in most smoothly with existing infrastructure and levels of technical sophistication and capacity. This may occur even though we may recognize the inadequacy of the existing level of infrastructure and capacity at an application site.

***Importance:***

Without overcoming this barrier, change and advancements will occur much more slowly than otherwise possible.

***How to overcome the barrier:***

Maximizing progress may require movement beyond pre-existing comfort zones in areas of design, application and control of treatment technologies. These advancements may require shifts in interpretation of “appropriate technology” in light of radical changes in cost and reliability of treatment and control technologies.

---

***Title:***                      **Insufficient processes to promote alternative technologies in the countries and in the region**

***Originator:***                Morales

***Barrier description:***

A shortage of water service to small populations has adverse health effects. This situation can be improved by the use of:

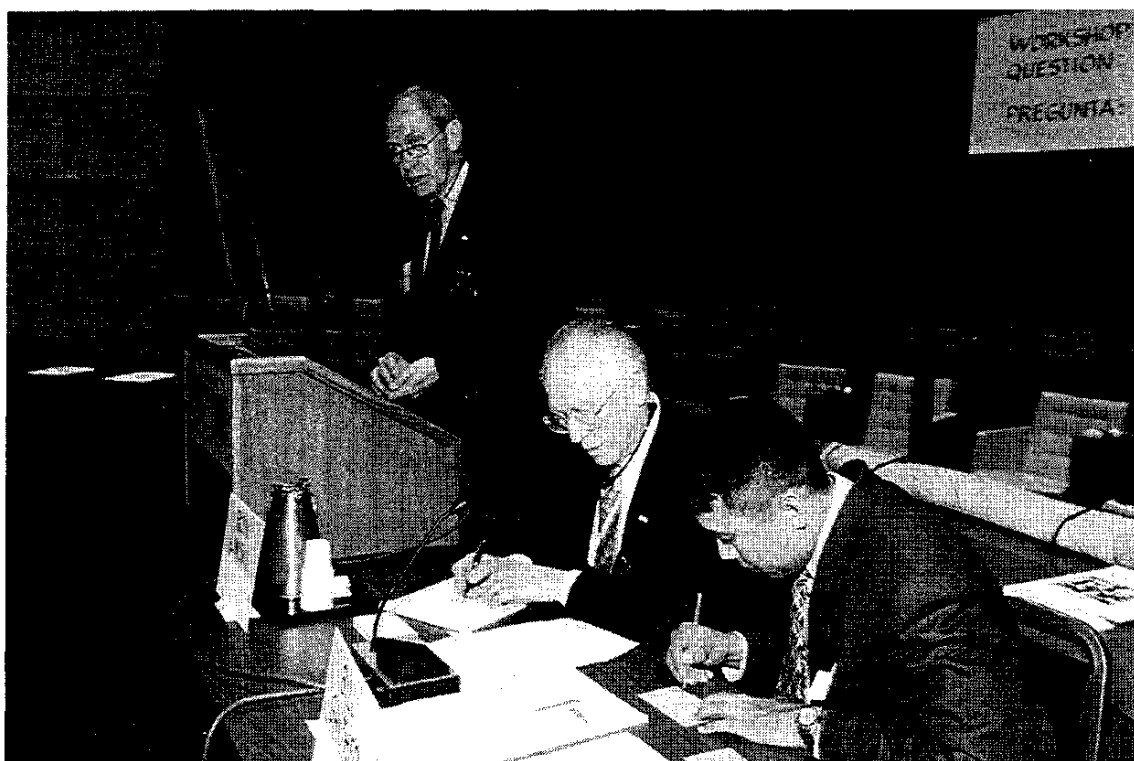
- Conventional technologies that provide definite solutions. These, however, are expensive but meet long-term needs
- Alternative technologies that provide definite solutions that are equally as efficient as conventional technologies but cost less and meet short- and medium-term needs. Due to the low availability of financial resources, the option to use alternative technologies at the country level becomes evident.

***Importance:***

- Technological: Permits human resources development and “manageable” and sustainable technological packages.
- Political: Promotes the establishment of clear guidelines for the development of policies, strategies, programs, and projects to supply safe water.
- Social: Reduces adverse health effects (important contributor) and permits the development of the principle of “empowerment.”
- Economical: Provides broad coverage and better quality of water at lower costs. Promotes the investment of the community, the local and national governments, and the international communities in the project.

*How to overcome the barrier:*

- Establish horizontal cooperation between countries.
- Form strategic alliances between countries and regional agencies in order to promote the transfer of alternative technologies and to delineate regional and national responsibilities.





## **Lack of Reference, Research, and Capacitation Centers**

**ORIGINATORS:**

Camacho on behalf of himself, Bartram, Cruz, Hartzell, Landman, and Orozco

*The following barriers were subsumed under the above title:*

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**Title:**                      **Lack of reference (data), research and training centers for the transfer of new methods and technology in water and sanitation systems for small communities**

**Originator:**              Camacho

***Barrier description:***

Small communities, especially those in rural areas, would receive current information and training in small systems through the establishment of reference (data), research, and training centers.

***Importance:***

Small communities lack experience in operating water and sanitation systems and are unaware of new technologies. These centers would provide information and training for the administrative and operations staff responsible for small systems.

***How to overcome the barrier:***

Establish reference and research centers to transfer information on new technologies applicable to small communities and to validate new technologies through demonstration projects.

Create training programs that will provide instruction to staff in project management as well as O&M of small systems.



---

**Title:** Irrelevant research

**Originator:** Bartram

***Barrier description:***

Research undertaken in wealthy and less-developed countries by both commercial institutions and companies is poorly oriented towards priorities and is supported by researchers who have limited, if any, training or experience in multi-disciplinary working.

***Importance:***

Research is important in problem identification; developing new and improved approaches to problem solving; and investigating the adoption, implementation and impact of different approaches.

***How to overcome the barrier:***

Direct promotion of interdisciplinary training of researchers, clear identification of priority areas requiring research, and their adoption and pursuit by research funding agencies.

---

**Title:** Lack of institutionalization of pilot studies

**Originator:** Cruz

***Barrier description:***

The projects that have been implemented were not capitalized and therefore were not analyzed at the central level of the government.

***Importance:***

Set up a system within the central government to conduct pilot studies, analyze/measure the results, and subsequently promote and implement projects in small communities.

***How to overcome the barrier:***

Many efforts are lost because projects were not well conducted based on technology and knowledge gained from pilot studies that would have greater appreciation to all sectors.

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**Title:**                      **Lack of awareness and education about currently available treatment options**

**Originator:**              Hartzell

***Barrier description:***

A significant barrier to providing safe drinking water is the lack of education and awareness of available technology options. Project designers and planners must be informed and educated about the wide variety of treatment options so they can make the best possible selection.

***Importance:***

Without knowledge of the best available and most appropriate technology for a specific application, inappropriate decisions will be made which will result in poor implementation and early failure.

***How to overcome the barrier:***

A way to overcome the educational barrier is to generate and distribute a comprehensive resource directory of currently available treatment options independently reviewed and categorized by application appropriateness, treatment effectiveness, energy source, initial cost, operating cost, repair and maintenance requirements, and volume production.

---

**Title:**                      **Reluctance to apply advanced technology capable of treating water reliably and cost effectively with reduced operator responsibility**

**Originator:**              Landman

***Barrier description:***

Although we desire advanced technical solutions to address contaminated water supplies, we have a natural tendency to fear both the effectiveness and reliability of unfamiliar advanced treatment and systems control technologies. As a result, we tend to view "appropriate technology" as that which is most reflective of existing infrastructure or fits in most smoothly with existing infrastructure and levels of technical sophistication and capacity. This may occur even though we may recognize the inadequacy of the existing level of infrastructure and capacity at an application site.

***Importance:***

Without overcoming this barrier, change and advancements will occur much more slowly than otherwise possible.

***How to overcome the barrier:***

Maximizing progress may require movement beyond pre-existing comfort zones in areas of design, application and control of treatment technologies. These advancements may require shifts in interpretation of “appropriate technology” in light of radical changes in cost and reliability of treatment and control technologies.

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***Title:*** Lack of skilled human resources

***Originator:*** Orozco

***Barrier description:***

Lack of skilled staff to handle the O&M of small systems.

***Importance:***

Good projects are not prepared, both technically and financially.

***How to overcome the barrier:***

Provide staff education and training on small systems O&M for small communities (rural population).

## **Different Interests Exist Between State Administrators and the Communities Regarding Solutions to Water Supply Problems**

**ORIGINATORS:**

Cruz on behalf of herself, Howard, and Lima

*The following barriers were subsumed under the above title:*

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**Title:** Different views exist between the state administrators and the rural communities with regard to solving water supply problems

**Originator:** Cruz

***Barrier description:***

State administrators and local governments have different views regarding the water supply and irrigation services for small communities.

***Importance:***

In rural communities, growing crops has a higher priority than public health. Because the water is clear, they believe there is no concern of consuming the water, and therefore that is no need for a treatment plant.

***How to overcome the barrier:***

Seek inter-institutional opportunities that consider water resource as a whole, including its problems.

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**Title:** Poor understanding of government roles in water supply provision in developing countries

**Originator:** Howard

***Barrier description:***

It is often not clear what role governments play in the provision and support of water supplies. While it is clear that many government-run programs have in the past been inefficient, there are also examples where governments have effectively provided small water supplies. It is also clear that donor countries may impose conditions on developing countries that they did not impose on their own public health infrastructure development. It is also clear that governments are expected to provide curative health services sometimes without playing a meaningful role in preventive interventions in water and sanitation.

***Importance:***

It is very debatable whether long-term sustainability of small water supplies can be ensured through community management without substantial support from more centralized agencies. This support may include assistance in major repair/rehabilitation works, support to community-based operators and financing of upgrading of systems. The lack of support from governments can be a major cause of poor sustainability. This does not mean community-based approaches should be weakened, but rather strengthened.

***How to overcome the barrier:***

External support agencies (ESAs) and NGOs need to recognize that developing capacity-financial, technical and human resources-in local and national government is required and adjust investment accordingly. Furthermore, the need for governments to define standards, designs and approaches to be adopted by all water and sanitation projects should be recognized and this facilitated by ESAs and NGOs. Governments themselves need make their own resources available to support community-managed small supplies.

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***Title:*** Lack of an integrated approach that coordinates the needs of the different sectors (governments, cooperative agencies, NGOs, and communities)

***Originator:*** Lima

***Barrier description:***

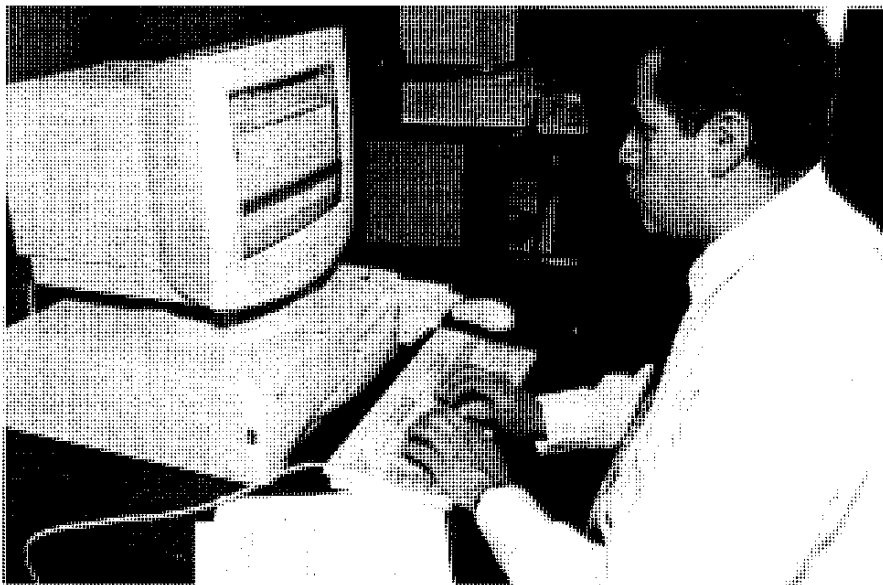
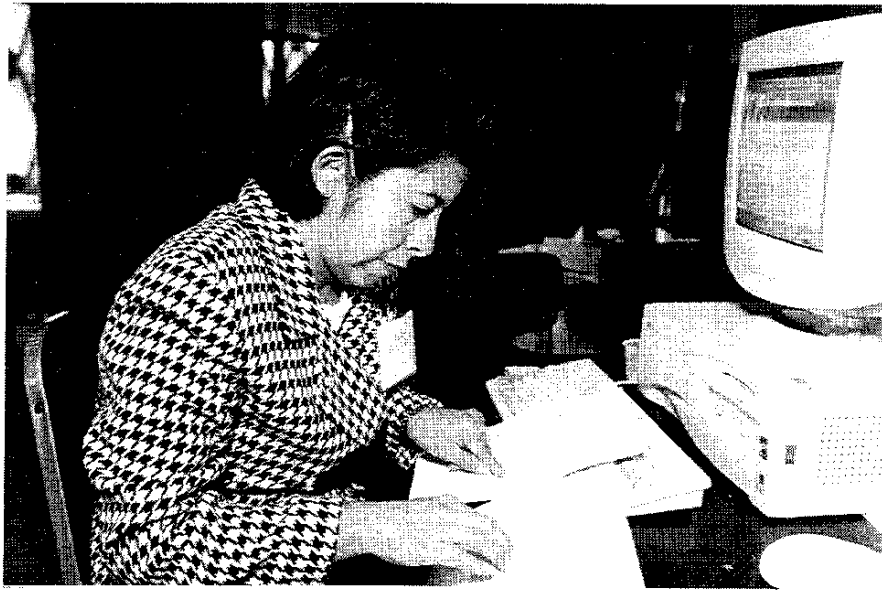
While the State recognizes the necessary changes in its role (paternalistic), the community often continues to demand solutions that the state by itself cannot provide.

***Importance:***

The unrealistic expectations and the lack of solutions aggravate the ability to resolve this barrier.

***How to overcome the barrier:***

- Harmonize the needs of the sectors to prevent tension or conflict situations.
- Negotiate.



## **External Support Fails to Reflect Community Realities While Reflecting ESA's Priorities Contrary to Their Declared Policy**

**ORIGINATORS:**

Austin on behalf of himself and Treasure

*The following barriers were subsumed under the above title:*

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**Title:** Lack of honesty on the part of multi-and bi-laterals in the implementation of the demand driven process

**Originator:** Austin

***Barrier description:***

Donor institutions reward employees for moving large sums of money, not for efforts in capacity building, training, or community participation. This approach leads to poorly operated and maintained infrastructures and unsustainable facilities and institutions.

***Importance:***

It promotes the top down, supply driven approach with emphasis on infrastructure. Use of performance monitoring on O&M, financial arrangements, and sustainability of the facility.

***How to overcome the barrier:***

Change the reward system for project managers. Build in indicators that are indicative of sustainability. Use performance-contracting procedures.



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***Title:*** Little understanding of "community reality" by lending agencies

***Originator:*** Treasure

***Barrier description:***

Agencies have taken few examples of community problems and have stereotyped the situation bringing an oversimplified opinion.

***Importance:***

The approach is a recipe for failure. The number of programs or systems that are non-functional can quantify it.

***How to overcome the barrier:***

It is important that locally based officers of the funding agencies try to integrate to the culture rather to mingle around the diplomatic core. The missions that visit the countries need to listen to the local knowledge with an open mind placing the stereotypes aside.

# **Users and Potential Users of Small Systems Are Not Adequately Empowered to Participate Effectively in the Democratic Processes**

**ORIGINATOR:**

Thompson on behalf of himself

*The following barrier was subsumed under the above title:*

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**Title:** The users and potential users of small systems are not adequately empowered to influence sectoral policies and programs or to participate effectively in projects

**Originator:** Thompson

***Barrier description:***

Weak institutional and legal frameworks result from weak policies or the absence of policies that make safe drinking water in small systems a priority.

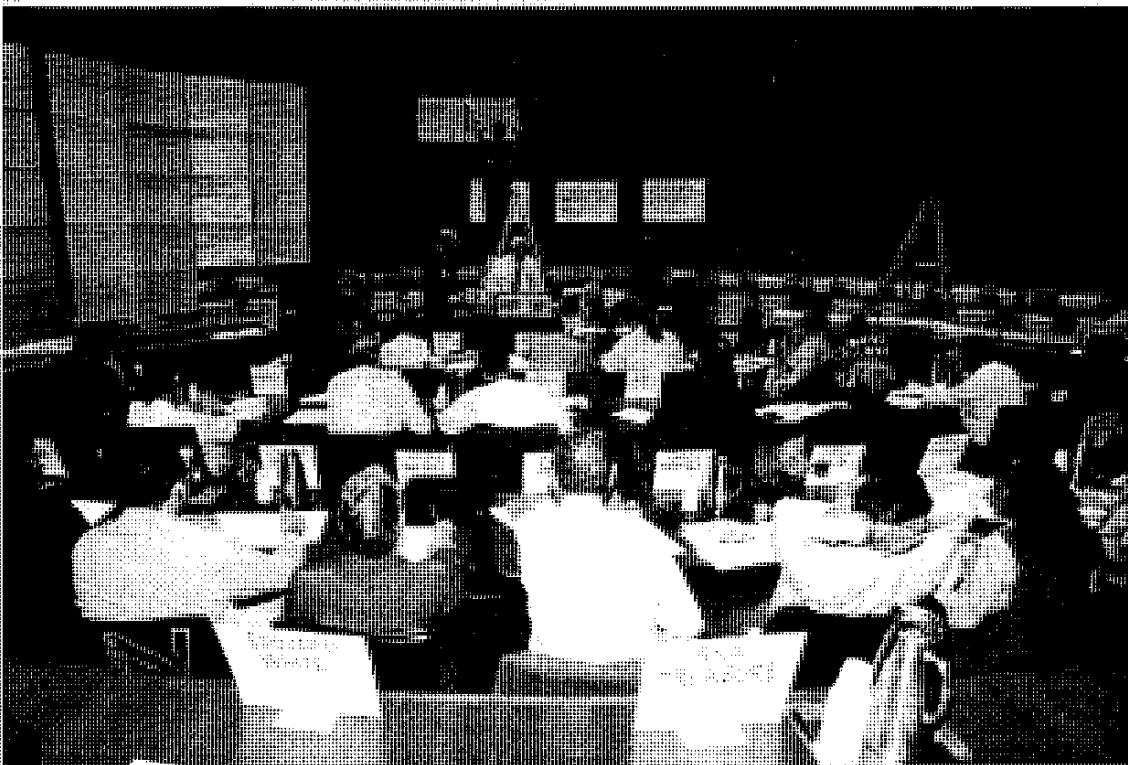
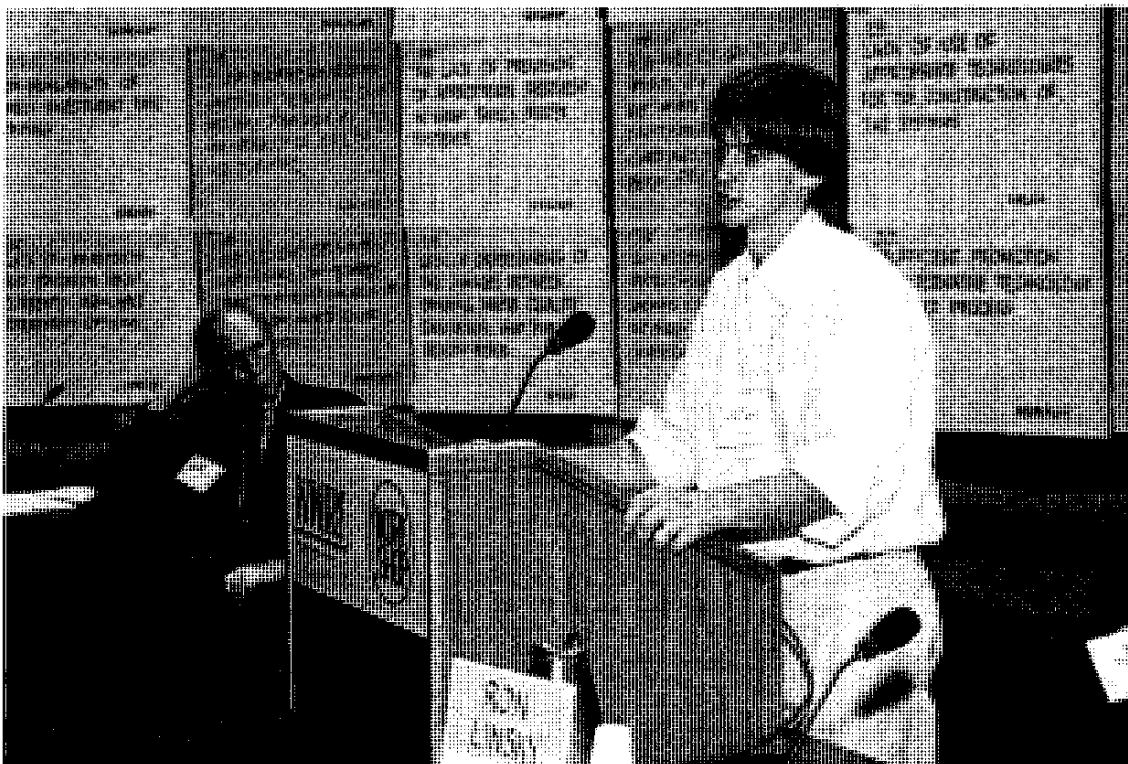
Many small communities, particularly poor ones, are not sufficiently educated, organized, nor informed and lack access to decision makers that would enable them to influence sectoral policies and programs and to participate effectively in projects.

***Importance:***

Without "empowerment," people cannot effectively achieve that their needs and priorities are incorporated in sectorial policies or programs, or in specific projects.

***How to overcome the barrier:***

The major lending institutions should put greater emphasis on education and other community development programs in their policy discussions and in their loan conditions.



## **Strengthen the Capacity of the Answer at an Inter-Institutional Level and Interdisciplinary Level of the Potable Water Sector**

**ORIGINATORS:**

Hernández on behalf of himself, González, Howard, and Okun

*The following barriers were subsumed under the above title:*

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**Title:** Fortify the ability to answer at interinstitutional and interdisciplinary levels of the potable water sector and basic sanitation in the marginal sectors

**Originator:** Hernández

***Barrier description:***

In the marginal sectors at rural and urban levels, there are few interventions that contribute to improving the coverage of sanitation services and their quality through lack of joint commitment at the municipal level. Other problems are prioritized and the mobilization of resources is made for other areas. It is important to surpass this barrier to create processes that allow contributions to improve the quality of life in these sectors.

***Importance:***

Most of the marginal communities count on deficient services; in most of the cases there are supply and distribution, but not treatment. This entails obtaining indexes of quite high morbidity and mortality in comparing them with the sectors that have access to adequate services.

***How to overcome the barrier:***

- Establish a policy in the marginal sectors (rural and urban) that allows the channel of older resources and their correct application.
- Raise awareness in the political sector and at the municipal level. Fortification of the political will.
- Involve the sanitation programs in the different sectors: health and education, for example.

---

***Title:***                      **Lack of a regulatory agency that can solve problems and support rural communities**

***Originator:***              González

***Barrier description:***

Lack of access roads to support small communities with drinking water systems.

***Importance:***

Many communities without access roads also lack communication systems, commerce, etc.

***How to overcome the barrier:***

- Raise government awareness so that solutions to these problems can be sought.
- Encourage donor agencies that support drinking water supplies to allocate additional funds to help overcome this problem.

---

***Title:***                      **Lack of integrated approaches to environmental health**

***Originator:***              Howard

***Barrier description:***

Infectious diarrheal diseases are spread through multiple transmission routes. Thus, if the purpose of “safe” water supplies is to reduce disease burdens, unless sanitation and hygiene are also addressed, the provision of water alone may have limited impact. Poor sanitation may lead to contamination of small supplies thus rendering them no longer “safe,” and poor hygiene may lead to recontamination of water in the home.

**Importance:**

To address public health issues it is essential that integrated approaches in service provision be adopted. Safe water alone is unlikely to lead to major improvements in health if excreta disposal remains inadequate and community and household hygiene practices are poor. Some quantification is possible which shows integrated approaches to environmental health provide a 20-30 percent greater decrease in incidence of infectious water-related diseases compared to single interventions.

***How to overcome the barrier:***

Water supply improvements should be part of an integrated approach to environmental health improvements which provide sanitation facilities which people want and will use and which are supported by hygiene promotion and education which maximizes the potential for communities to identify both problems and solutions to health problems. This requires that investment be balanced between water, sanitation, and health promotion.

**Title:**

### Absence of local institutions to sustain local water supply facilities

**Originator:**

Okun

**Barrier description:**

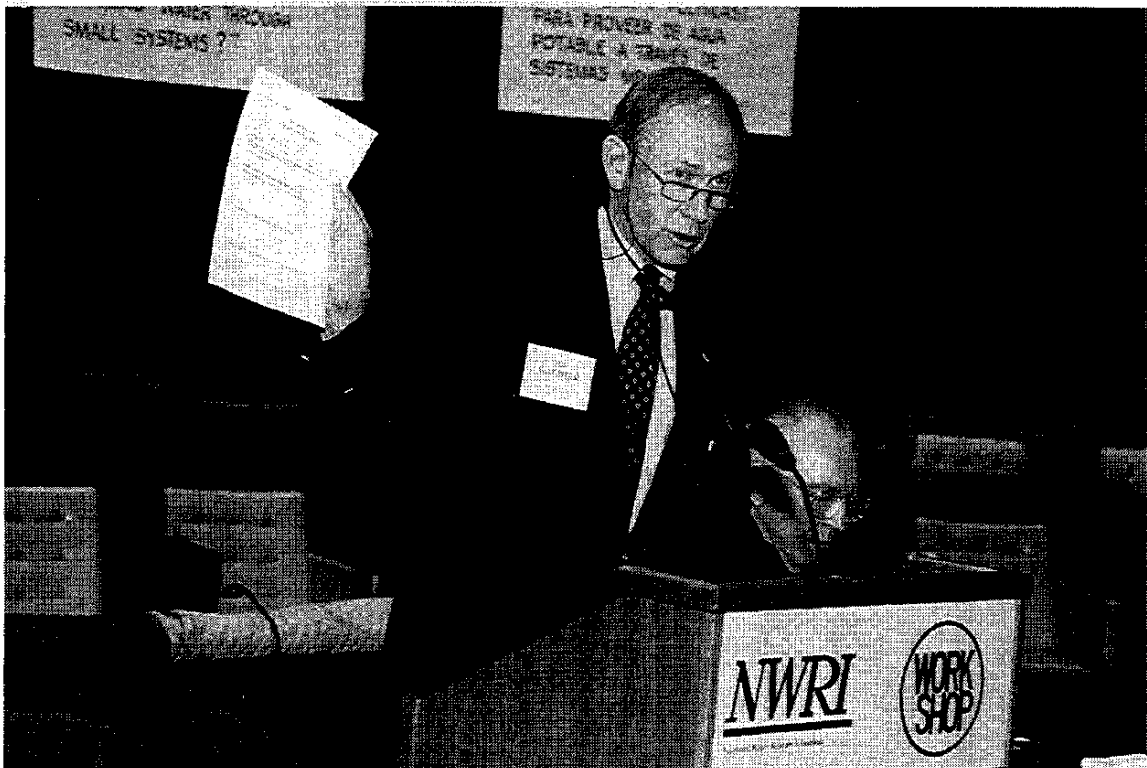
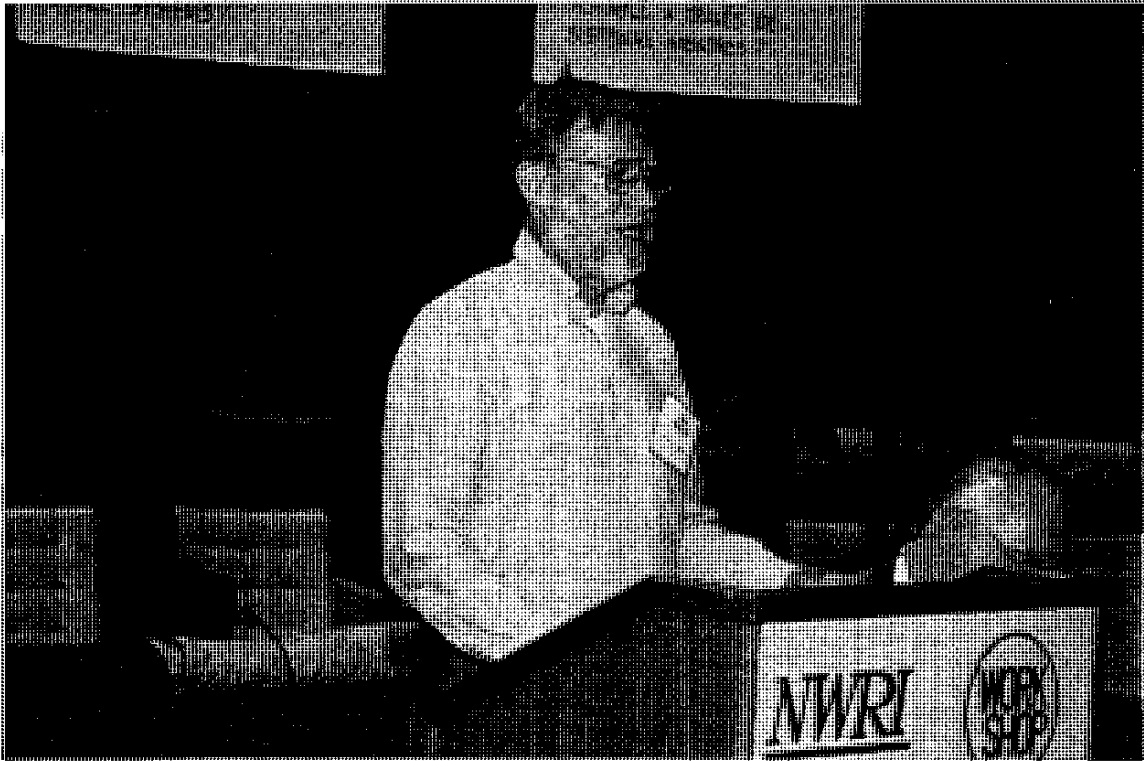
Funds are generally available from outside sources to build water supply facilities. To sustain the operations and maintenance of these facilities requires funds that are not generally available from outside sources. The people served must be the source of funds for sustaining the system.

**Importance:**

Without overcoming this barrier, the system will disintegrate and the potential for correcting the situation will be small.

***How to overcome the barrier:***

Involve the people of the communities in the provision of the water supply system in the first place, so that they will feel “ownership” of the system and will understand that it takes money to have the system operate and be maintained. This will lead to acceptance of the need to pay for the water service on a continuing basis to sustain the system. From this background, an organization can be created. This organization can then initiate other water supply and sanitation projects.



# **Lack of Provision of Appropriate Treatment in Many Small Water Systems**

## **ORIGINATORS:**

Jiggins on behalf of himself, Austin, Landman, and Mejia

*The following barriers were subsumed under the above title:*

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**Title:** The lack of provision of appropriate treatment in many small water systems

**Originator:** Jiggins

### ***Barrier description:***

The barrier is the result of a previous long-term focus on the requirements of the needs of the higher proportions of people who are supplied by large water systems. Many small water systems have no treatment provision. The difficulties and expense of assessing the water quality and need for treatment in small water supplies have given it a low priority in terms of funding.

### ***Importance:***

The barrier is significant because it has been demonstrated that appropriate treatment can be effective in providing satisfactory water quality from small water systems providing it is appropriate with correct operations and maintenance. It is very difficult to quantify the barrier, although the numbers of small water supplies that receive treatment may be estimated; the extent to which they produce satisfactory water quality will depend on the provision of adequate monitoring data.

### ***How to overcome the barrier:***

- A stronger commitment to provide improved support for the operation of small water systems.
- Improved assessment of small systems should ensure that appropriate treatment provision is made.



- Treatment needs to be appropriate if there is to be confidence that a groundwater source is well protected and of very good quality – there may be no need for treatment.
  - Sources with very low levels of contamination may be effectively protected by chlorination.
  - Sources with significant levels of contamination require additional treatment.
- 

***Title:***                      **Lack of development of performance objectives for internal and external training**

***Originator:***              Austin

***Barrier description:***

Training is often provided by local and national institutions that are not based on the needs of the institutions. When trainees return, they should make their new knowledge and skills a part of their daily performance. Without clear objectives of training needs and training programs designed to meet these needs, trainees will not improve their performance on the job.

***Importance:***

Training that does not improve the performance of the individual and the institution is an ineffective use of monetary and human resources. Clear objectives for the institution, trainee, and training program will lead to performance indicators that can be easily measured.

***How to overcome the barrier:***

- Carry out a need assessment for the institution.
- Match institutional needs to individuals and training programs.
- Select trainees (supervisor involvement necessary).
- Carry out training.
- Trainee uses new knowledge and skills on the job and provides training for others.
- Evaluate performance of individuals and institution.

---

**Title:** Reluctance to apply advanced technology capable of treating water reliably and cost effectively with reduced operator responsibility

**Originator:** Landman

***Barrier description:***

Although we desire advanced technical solutions to address contaminated water supplies, we have a natural tendency to fear both the effectiveness and reliability of unfamiliar advanced treatment and systems control technologies. As a result, we tend to view “appropriate technology” as that which is most reflective of existing infrastructure or fits in most smoothly with existing infrastructure and levels of technical sophistication and capacity. This may occur although we may recognize the inadequacy of the existing level of infrastructure and capacity at an application site.

***Importance:***

Without overcoming this barrier, change and advancements will occur much more slowly than otherwise possible.

***How to overcome the barrier:***

Maximizing progress may require movement beyond pre-existing comfort zones in areas of design, application and control of treatment technologies. These advancements may require shifts in interpretation of “appropriate technology” in light of radical changes in cost and reliability of treatment and control technologies.

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**Title:** Non-use of appropriate technology in the construction of systems

**Originator:** Mejía

***Barrier description:***

Sophisticated systems are being constructed in small communities in lieu of small systems that would be just as adequate and would provide greater coverage for small communities.

***Importance:***

The costs of constructing a sophisticated system could be used to construct several small systems. The operation and management of a small system would be more appropriate for a small community.

***How to overcome the barrier:***

- Change the approach to decision-making and project design through better communication, education, and information exchange with the community
- Include research, analysis, plans of actions, monitoring, pilot projects, prioritization, and community participation as part of the planning and implementation processes of a program.

## **Lack of Clear, Firm, and Fair Regulatory and Enforcement Programs Dedicated to Drinking Water Quality and Source Water Protection**

### **ORIGINATORS:**

Kimm on behalf of himself, Bartram, Philippeaux, and White

*The following barriers were subsumed under the above title:*

---

**Title:** Lack of clear, firm and fair regulatory and enforcement programs dedicated to drinking water quality and source water protection

**Originator:** Kimm

### ***Barrier description:***

Without laws, standards, and enforcement, there will be inadequate incentives to meet quality specifications, especially when extra efforts are required. Complacency.

### ***Importance:***

It is reasonable to expect that government must exercise its responsibilities to protect citizens. Without ambient waters standards and source water protection programs, contamination of drinking water supplies will not be controlled.

### ***How to overcome the barrier:***

- Create credible legal structures at federal, provincial and local levels.
- Train government officials.
- Demand honest performance from officials.
- License large water providers.

- Create a professional cadre of operators.
- Provide training and assistance for water suppliers.
- Provide reasonable penalties for non-compliance.

---

**Title:** Counterproductive regulatory schemes

**Originator:** Bartram

***Barrier description:***

Legislative/regulatory regimes have been primarily designed to ensure that formal supply agencies provide a defined (optimal) service quality in the systems they administer. Such regimes are inapplicable in small communities and run counter to the “wisdom” arising from the water need: “Some for all rather than all for some.”

***Importance:***

It significantly contributes to inequality by promoting perfection in already-established supplies while ignoring the plight of unsupplied populations. It also demands resources. May also impede community acceptance of responsibility for management.

***How to overcome the barrier:***

Difficult as relates to sovereignty. Review and consolidate experience with regulation of small supplies; dissemination of this among regulatory agencies and legislators.

---

**Title:** Poor land planning and development policy and lack of enforcement may affect quality services related to small systems

**Originator:** Philippeaux

***Barrier description:***

In rural areas and isolated villages with difficult accessibility, dispersed housing are often impediments in providing safe drinking water and guaranteeing maintenance.

***Importance:***

This barrier became major due to the high cost of investment and high tariff imposed on community users. In addition, this barrier limits the quality of services and is not conducive for state support and regular monitoring.

***How to overcome the barrier:***

- Issuance of a good land planning and development policy.
  - Capacity of governments to enforce the policy.
- 

***Title:*** Lack of a meaningful legislative environmental policy and regulatory reforms, compliances, and standards

***Originator:*** White

***Barrier description:***

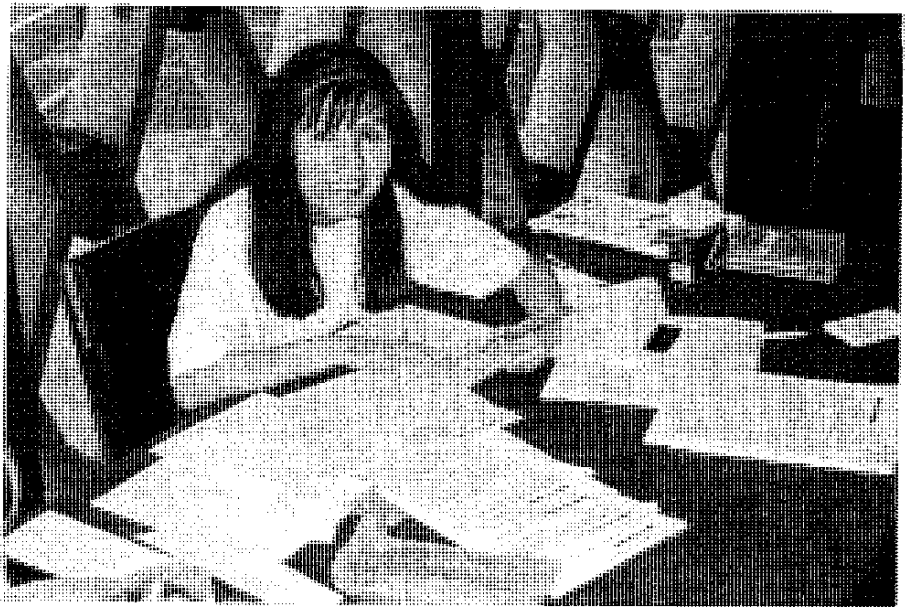
Lack of legislation in place and the implementation of that legislation reflecting policies focusing on a commitment to environmental and ecological beliefs and agendas.

***Importance:***

It is important because without a specific tangible commitment, water and sanitation agencies within that government will not have the necessary leadership, support, and direction to address the needs of their citizens. It is significant because its absence aborts master plans, strategies, funding opportunities, and general trust in a government purported to serve the people. It is also quantifiable as a reflection of specific projects not built, funding not received, devastation by diseases, and elections lost.

***How to overcome the barrier:***

Begin at the local level politically, and organize an effort to speak with the town/village/district representative who sits at the national legislative level by concretely showing that person the problems and tangible results of a lack of national policy and implementation, and the definitive water/sanitation needs of that community. Encourage this legislation to reflect community-based decision making and capacity building.



## **Poor Implementation of Monitoring Water Supplies and Limited Use of Information for Management**

### **ORIGINATORS:**

Howard on behalf of himself, Kimm, Landman, and Philippeaux

*The following barriers were subsumed under the above title:*

---

**Title:** Poor implementation of monitoring water supplies and limited use of information for management

**Originator:** Howard

### ***Barrier description:***

As there is frequently an almost total lack of monitoring water supplies, we frequently do not know what the status of our systems is at any one time. Furthermore, information collected is frequently not used in any meaningful way to improve performance of water supplies. Without adequate information and a willingness to act on this information, the sustainability of small supplies as "safe" is likely to be compromised.

### ***Importance:***

At any one time, governments, donors, and NGOs may not know how many systems they constructed still function effectively, and therefore investment may become distorted towards new capital investment and limit resources for maintenance and management improvement of existing supplies. Thus, much investment provides limited benefits, and cost benefit analyses carried out at the construction phase of water supply improvement become unreliable. Furthermore, supplies fail leading to use of less safe sources.

### ***How to overcome the barrier:***

Develop cost-effective monitoring systems that address aspects such as water quality, continuity, cost, quantity and use. This data should be consolidated at national and provincial levels and in a form that is of use to planners, engineers, social scientists and communities.



Furthermore, development of techniques accessible to communities to monitor and improve management of their supply is essential, and this will require technical and financial support from government. This would assist national and local governments perform the role that the donor community has defined for them.

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***Title:***                      **Lack of clear, firm and fair regulatory and enforcement programs dedicated to drinking water quality and source water protection**

***Originator:***              Kimm

***Barrier description:***

Without laws, standards, and enforcement, there will be inadequate incentives to meet quality specifications, especially when extra efforts are required. Complacency.

***Importance:***

It is reasonable to expect that government must exercise its responsibilities to protect citizens. Without ambient waters standards and source water protection programs, contamination of drinking water supplies will not be controlled.

***How to overcome the barrier:***

- Create credible legal structures at federal, provincial and local levels.
- Train government officials.
- Demand honest performance from officials.
- License large water providers.
- Create a professional cadre of operators.
- Provide training and assistance for water suppliers.
- Provide reasonable penalties for non-compliance.

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**Title:** Absence of water quality sampling and analysis providing precise characterization of site-specific baseline raw water chemistry

**Originator:** Landman

***Barrier description:***

The lack of objective analytical data which specifically quantifies baseline chemistry and physical characteristics of existing raw water supplies at a local, site-specific level.

***Importance:***

Actual data quantifying the extent and concentration of contaminants in specific drinking water supplies may be the single most motivating factor in creating demand for improved drinking water supplies. Once known and disseminated, this analytical data is a particularly powerful agent for change, particularly in democratic regions.

***How to overcome the barrier:***

Institutional and political support of and funding for actual sampling and analysis of drinking water provided at a site-specific level throughout the world, including developing regions.

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**Title:** Lack of proper and regular maintenance of small systems

**Originator:** Philippeaux

***Barrier description:***

Small systems are not properly maintained and often are not adequately operated causing breakdowns and inoperation. Problems of spare parts, killed operators, and lack of involvement by resident communities are usually the cause.

***Importance:***

The life span of the system is reduced – affects quality of the water.

***How to overcome the barrier:***

- Strategy, resources required skills of operators, plans of operation, role of community must be considered during the planning stage – if to ensure sustainability of small systems.
- Local authorities must take a stake in the management of small systems. They need to constantly monitor the small systems and allocate technical and financial resources for emergency repairs.

## Willingness to Pay

### ORIGINATORS:

Treasure on behalf of herself, Hofmeyr, Landman, Mahadew, and Rosasco

*The following barriers were subsumed under the above title:*

---

**Title:** Willingness to pay

**Originator:** Treasure

### ***Barrier description:***

Provision of basic services to informal settlements has traditionally been handled as a political issue with the exception of times of a disease outbreak. The majority of our squatter communities – especially the urban ones – are terribly hostile; we are talking about war-zones.

Top-down approaches have always been used because of accessibility and ignorance of the population. We are talking about a group with lots of expectations but unwilling to pay for a service that they believed should be provided by the government.

### ***Importance:***

We have people living there, people who need to be given the basics to prevent an outbreak of disease in the area and in the entire country.

It can be quantified by the amount of infections and the mortality rates.

### ***How to overcome the barrier:***

Education – but how to educate someone about adequate hygiene practices when this person has no education whatsoever.

It is difficult to make expectations lower when there is a strong foreign influence coming not only from television but by comments of relatives overseas.

---

**Title:** Collecting revenue from sales of water

**Originator:** Hofmeyr

***Barrier description:***

In small schemes, people may use only approximately 25 l/day each. For example, if \$1.50/m<sup>3</sup> is a realistic target price, this means collecting less than \$0.04 per person per day.

***Importance:***

If you cannot collect the money, you cannot service the loan or pay for O&M and depreciation. Flat fees lead to wastage.

***How to overcome the barrier:***

Find efficient ways to collect revenue and make these an integral part of water supply projects.

---

**Title:** Lack of consensus regarding whether safe drinking water is an entitlement or a commodity yielding divergent views about who should pay, how, and how much

**Originator:** Landman

***Barrier description:***

Variation in views at and among local, regional, national, and international levels regarding drinking water as a natural resource and, therefore, an entitlement versus drinking water as a commodity gives rise to social issues about willingness to pay and economic issues about how to allocate payments among consumers in a fair, reasonable, and sustainable form.

***Importance:***

This barrier is a core political, social, and economic issue affecting both macro and micro public policy and finance strategies.

***How to overcome the barrier:***

Use the political process to address the question of whether required infrastructure revenue is to be raised at a consumptive level based on individual and personal use or at a local or national public level with taxing authorities responsible for raising and leveraging funds necessary for needed water treatment infrastructure.

---

***Title:***                      **Lack of adequate tariff structures**

***Originator:***              Mahadew

***Barrier description:***

The present tariff structure in my country (Suriname) does not leave room for recovering the costs of investments or even to cover the cost of operations and maintenance. A big problem is that consumers that can afford to pay a more realistic tariff are subsidized. Government subsidies and external funds are much harder to attract.

***Importance:***

The low revenues have a negative impact on the level of service. Although the government imposes these low tariffs, its subsidy is not adequate to cover the deficits the institutions are confronted with.

The consequences are ill-maintained utilities and a lack of motivation by underpaid, however well trained, staffs to run the institutions professionally.

Another negative impact is that low and inadequate tariff structures are not attractive for private initiatives in these sectors.

***How to overcome the barrier:***

- Create a more liberal pricing regimen that allows water supplying institutions room to maintain realistic tariff structures.
- The socially weak should be supported by a subject subsidy program.
- Donor countries and agencies in their development relationships should demand these recommendations.

---

***Title:*** Economic disability

***Originator:*** Rosasco

***Barrier description:***

Families that earn less than US\$90.00 a month are unable to pay for safe water. The lack of revenue from users will affect the financing required for sustainability of small systems.

***Importance:***

Families in need require financial aid in order to afford safe water and sanitation services.

***How to overcome the barrier:***

Provide subsidy programs for families in need.

## **Cost/Benefit of a System to Be Implemented**

**ORIGINATORS:**

Orozco on behalf of himself, Hofmeyr, Mahadew, and Rivera

*The following barriers were subsumed under the above title:*

---

**Title:** Cost-benefit of the system to be implemented

**Originator:** Orozco

***Barrier description:***

Small communities and scattered rural populations are usually located far from the sources of supply. The cost of connecting to these sources exceeds the per capita costs established by financial entities.

***Importance:***

Need for a technical and economic feasibility study to determine the optimum system for a small community.

***How to overcome the barrier:***

- Involve community participation in all the phases of implementing a system.
- Seek specific financing considerations (government subsidies, external funding) for these cases.



---

**Title:** The “demand responsive approach” implies a costly range of options

**Originator:** Hofmeyr

***Barrier description:***

We understand communities should receive the services they want and can afford. This may require a range of water qualities and delivery mechanisms from raw water at a point outside the town to potable water piped to individual homes, and options in between.

***Importance:***

If wealthy people are offered low quality services, they want more. If the poor are offered services that are too expensive, they will tend to other mechanisms of getting water. Both are inefficient.

***How to overcome the barrier:***

Conventional marketing techniques solve this type of problem every day. Where possible, the private sector should operate freely with a minimum of government interference. If governments want to subsidize water supplies, the Department of Welfare should support those who need it. It is not the job of the water provider to subsidize the poor, by supplying water at less than its real value.

---

**Title:** Lack of adequate tariff structures

**Originator:** Mahadew

***Barrier description:***

The present tariff structure in my country (Suriname) does not leave room for recovering the costs of investments or even to cover the cost of operations and maintenance. A big problem is that consumers that can afford to pay a more realistic tariff are subsidized. Government subsidies and external funds are much harder to attract.

***Importance:***

The low revenues have a negative impact on the level of service. Although the government imposes these low tariffs, its subsidy is not adequate to cover the deficits the institutions are confronted with.

The consequences are ill-maintained utilities and a lack of motivation by underpaid, however well trained, staffs to run the institutions professionally.

Another negative impact is that low and inadequate tariff structures are not attractive for private initiatives in these sectors.

***How to overcome the barrier:***

- Create a more liberal pricing regimen that allows water supplying institutions room to maintain realistic tariff structures.
- A subsidy program should support the socially weak.
- Donor countries and agencies in their development relationships should demand these recommendations.

---

***Title:***                      **Direct financing to small communities**

***Originator:***              Rivera

***Barrier description:***

Every infrastructure project requires financing, whether it is reimbursable or not. It therefore becomes necessary to create procedures that will allow small communities to have access to financial resources.

***Importance:***

Community participation, through its requirements and its own projects, can make it possible for small communities to receive local financing from government resources or from multilateral entities. It is necessary that the technologies to be applied are compatible with the way in which the projects will be carried out without discarding the most recent technology that can be utilized.

***How to overcome the barrier:***

Create organizations that are in agreement with the reality of each country and that can manage the financial resources available to a project based on a Socio-economic evaluation conducted by an organization's work committee. In some cases, loans will be issued on a non-reimbursable basis; in other cases, loans will be repaid in full.

## **Failure to Value all Indirect Costs Associated with Contaminated Water and Invest in Water Treatment at Levels Comparable to These Costs**

**ORIGINATOR:**

Landman

***Barrier description:***

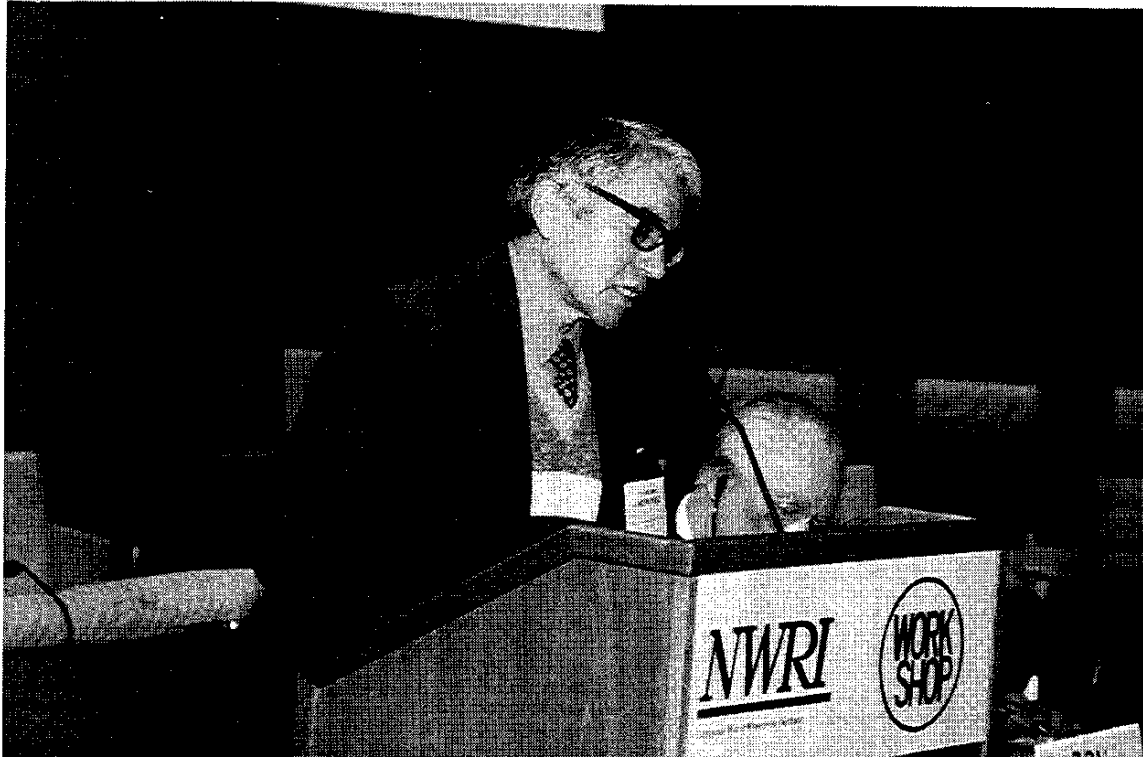
Failure to quantify indirect costs of contaminated water (i.e., costs as diverse as health care costs, costs associated with developmental impairments in children, productivity losses in adults, costs of fuel required to boil water, etc.) results in an economic undervaluation of purified water. Given this undervaluation, investment funds applied toward treating contaminated water supplies do not correlate to the direct and indirect baseline costs associated with contaminated water.

***Importance:***

If all costs associated with contaminated drinking water supplies are not fully assessed, investment in corrective treatment measures will not correlate with such costs.

***How to overcome the barrier:***

Inventory the direct, indirect, internal and external costs associated with contaminated drinking water supplies and match investment in water treatment infrastructure more closely to the broader definition of the costs associated with contaminated drinking water.



## **Lack of Adequate Water Sources**

**ORIGINATORS:**

Ramos on behalf of himself and González

*The following barriers were subsumed under the above title:*

---

**Title:**                      **Serious scarcity of water sources due to contamination, deforestation, and over-exploitation**

**Originator:**              Ramos

***Barrier description:***

- What is the barrier? Scarcity of water sources.
- Why is it important to overcome this barrier? In order to provide communities with adequate water and sanitation services that will result in improvements to health and standards of living.

***Importance:***

The lack of water in El Salvador will soon become a dangerous situation. Communities that own their water sources are struggling violently to maintain their resources and keep other communities from exploiting their water source (this is a social problem).

***How to overcome the barrier:***

- Enact legislation to regulate water resources.
- Include community participation in the planning process for water and sanitation programs and in the protection of water basins.
- Educate the public regarding the protection of their water resources.

- Use alternative methods for obtaining water suitable for human consumption (e.g., rainwater).
- Institute water conservation practices.

---

**Title:**                      **Lack of a suitable sources for the supply of potable water to communities**

**Originator:**              González

***Barrier description:***

Lack of an adequate amount of water in the area of the community.

It is important to overcome this barrier in order to adequately support the communities with small potable water systems.

***Importance:***

This barrier is significant because there are many communities that do not have water because of the destruction of forests and the geologic formation in the area of the community. This barrier can be quantified because it is known, and there are many.

***How to overcome the barrier:***

- Strong reforestation.
- Look for other alternative solutions like tanks (from winter water storage) to supply during the summer.
- That the agreements with the donor countries allow us to construct pilot or special projects.

## **Inability of the Central Government to Monitor the Quality of Water**

**ORIGINATOR:**

Ordóñez

***Barrier description:***

The central government should establish a regulatory process such that local operating agencies can comply with water quality standards.

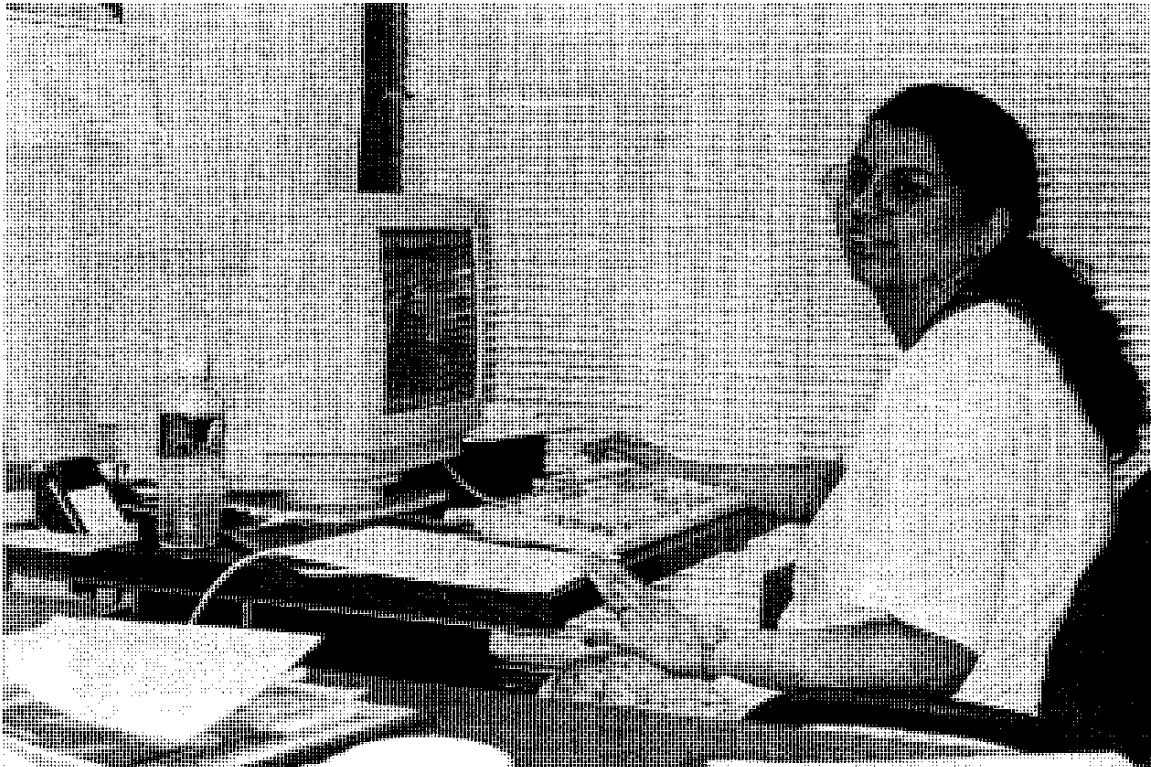
***Importance:***

To ensure that the population of consumers receives bacteriologically safe drinking water.

***How to overcome the barrier:***

- Design and implement practical and sustainable surveillance systems.
- Convince politicians that it is fundamental to provide resources for water quality surveillance programs.
- Clarify legal and administrative responsibilities in this matter.





## Strong Paternalistic Heritage in Solving Local Problems

**ORIGINATOR:**

Ordóñez

***Barrier description:***

Many communities hope that someone else will provide them with water and sanitation services and do not feel responsible for implementing their own projects.

***Importance:***

That “someone else” usually is the central government which has ever-increasing demands to finance water and sanitation projects.

***How to overcome the barrier:***

- Education and awareness.
- Better institutions at the local level
- Rates that cover all the operational costs and fortuitously come to finance the investment costs.



# **Conflicts Between Professional Engineers, Authorities, and Communities**

**ORIGINATORS:**

Cruz on behalf of herself and Mejia

*The following barriers were subsumed under the above title:*

---

**Title:**                      **Insufficient or inadequate project coordination between technicians, professionals, government, and communities**

**Originator:**              Cruz

***Barrier description:***

Lack of coordination and communication between all entities involved in the project (i.e., engineers work on solving water problems; authorities lack sufficient information support for making the decisions; communities are unaware of implemented solutions and the associated responsibilities and benefits).

***Importance:***

The authorities that make decisions affecting the community do not involve the community in the decision-making process. Engineers can help the community to define the problem and conditioning factors that should effect a solution. Engineers with knowledge of the community and its environment can propose a solution that is consonant with the community's needs and that can be sustained over time.

***How to overcome the barrier:***

- Include community participation from the project-planning phase to implementation.
- Creating regional entities to provide technical assistance to the administrative companies.
- Set clear technical standards.

- Include social issues in engineering training programs.
  - Train personnel in charge of operating the water supply systems.
- 

***Title:***                      **Non-use of appropriate technology in the construction of systems**

***Originator:***              Mejía

***Barrier description:***

Sophisticated systems are being constructed in small communities in lieu of small systems that would be just as adequate and would provide greater coverage for small communities.

***Importance:***

The costs of constructing a sophisticated system could be used to construct systems. The operation and management of a small system would be more appropriate for a small community.

***How to overcome the barrier:***

- Change the approach to decision-making and project design through better communication, education, and information exchange with the community
- Include research, analysis, plans of actions, monitoring, pilot projects, prioritization, and community participation as part of the planning and implementation processes of a program.

## **Lack of Data Bases**

**ORIGINATOR:**

Rosasco

***Barrier description:***

Lack of current, verifiable, statistical, demographics information on: population (e.g., population growth, migration, age, etc.), natural resources, climate variations, endemic diseases, capacity of saving, debt-serving capacity, etc. This information would make it possible to correctly execute projects.

***Importance:***

The success of a project is dependent upon the availability of correct information. Failure results when data is assumed or cannot be verified. The quantification of this barrier is as important as the cost of the project.

***How to overcome the barrier:***

Invest more time and resources in data collection and field studies.



## Norms, Rules, and Standards That Are Not in Accordance with the Local Reality

### ORIGINATORS:

Rosasco on behalf of himself, Kimm, and White

*The following barriers were subsumed under the above title:*

---

**Title:** Norms, rules, and standards that are not in accordance with the local reality

**Originator:** Rosasco

### ***Barrier description:***

Many small communities are unable to meet the technical and legal regulations for water and sanitation services set by national and/or international bodies. Amending these regulations will allow more communities access to water and sanitation services that meet their most elementary needs.

### ***Importance:***

Current regulations do not permit, in many cases, the use of alternative, less costly, small systems that can adequately meet the communities' needs.

### ***How to overcome the barrier:***

When setting regulations, governments should first consider the need for flexibility at the local community level.



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***Title:***                      **Lack of clear, firm, and fair regulatory and enforcement programs dedicated to drinking water quality and source water protection**

***Originator:***              Kimm

***Barrier description:***

Without laws, standards, and enforcement, there will be inadequate incentives to meet quality specifications, especially when extra efforts are required. Complacency.

***Importance:***

It is reasonable to expect that government must exercise its responsibilities to protect citizens. Without ambient waters standards and source water protection programs, contamination of drinking water supplies will not be controlled.

***How to overcome the barrier:***

- Create credible legal structures at federal, provincial and local levels.
- Train government officials.
- Demand honest performance from officials.
- License large water providers.
- Create a professional cadre of operators.
- Provide training and assistance for water suppliers.
- Provide reasonable penalties for non-compliance.

---

***Title:*** Lack of a meaningful legislative environmental policy and regulatory reforms, compliances and standards

***Originator:*** White

***Barrier description:***

Lack of legislation in place and the implementation of that legislation reflecting policies focusing on a commitment to environmental and ecological beliefs and agendas.

***Importance:***

It is important because without a specific tangible commitment, water and sanitation agencies within that government will not have the necessary leadership, support, and direction to address the needs of their citizens. It is significant because its absence aborts master plans, strategies, funding opportunities, and general trust in a government purported to serve the people. It is also quantifiable as a reflection of specific projects not built, funding not received, devastation by diseases, and elections lost.

***How to overcome the barrier:***

Begin at the local level politically, and organize an effort to speak with the town/village/district representative who sits at the national legislative level by concretely showing that person the problems and tangible results of a lack of national policy and implementation, and the definitive water/sanitation needs of that community. Encourage this legislation to reflect community-based decision making and capacity building.



## **Lack of Coordination Among Water Supply Programs and Projects**

**ORIGINATOR:**

Morales

***Barrier description:***

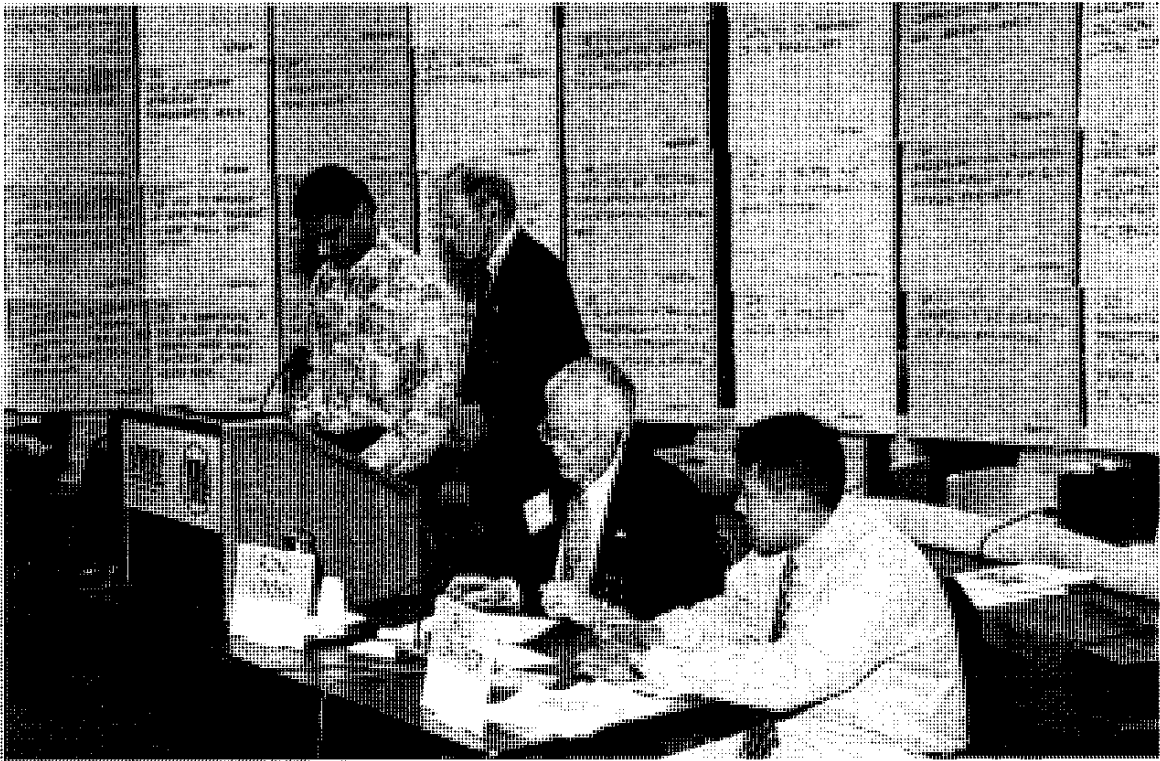
Institutions and agencies set their own priorities when developing water supply programs and projects resulting in competition rather than the coordination. This leads to programs and projects working against each other and not considering local needs or conditions.

***Importance:***

Overcoming this barrier is important because it would demonstrate to international organizations the better utilization of resources and consequently improvements of the public health and well being of its citizens.

***How to overcome the barrier:***

- At the country level promote programs at the inter-institutional and interagency levels.
- At the regional or sub-regional level, encourage communication and coordination between the departments responsible for water and sanitation systems in the rural areas.



## **Contamination of Sources**

### **ORIGINATORS:**

Cruz on behalf of herself, Landman, Lima, and Ramos

*The following barriers were subsumed under the above title:*

---

**Title:** Contamination of sources

**Originator:** Cruz

### ***Barrier description:***

Technology needed to purify water is more sophisticated and, consequently, more expensive. Searching for other sources of uncontaminated water also contributes additional costs to the project.

### ***Importance:***

Sustainability of a system becomes more difficult because the investments necessary to treat water or to find new uncontaminated sources of water are substantial. Those costs added to the costs of O&M exceed the ability of a community to pay for the system.

### ***How to overcome the barrier:***

Set up programs: environmental sanitation, efficient use of the resources, community involvement, wastewater treatment, and the utilization of clean technologies for water treatment.

---

**Title:** Absence of water quality sampling and analysis providing precise characterization of site-specific baseline raw water chemistry

**Originator:** Landman

***Barrier description:***

The lack of objective analytical data which specifically quantifies baseline chemistry and physical characteristics of existing raw water supplies at a local, site-specific level.

***Importance:***

Actual data quantifying the extent and concentration of contaminants in specific drinking water supplies may be the single most motivating factor in creating demand for improved drinking water supplies. Once known and disseminated, this analytical data is a particularly powerful agent for change, particularly in democratic regions.

***How to overcome the barrier:***

Institutional and political support of and funding for actual sampling and analysis of drinking water provided at a site-specific level throughout the world, including developing regions.

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**Title:** Not to consider the community as a subject of development

**Originator:** Lima

***Barrier description:***

The community continues being considered, often, as the subject of development. They continue applying programs that do not count on social participation as management of social politics. (Operating in the identification of its problems and possible solutions, choosing the one of greater acceptance, and committing themselves in implementing, managing, and evaluating the process.)

***Importance:***

The importance is given by the absence of social participation in the management of its own development, which affects the strength of these processes directly.

***How to overcome the barrier:***

Find ways that make social participation possible and the taking of conscience on the part of the individuals and communities, so that they move from “beneficiaries” (passive subjects of social politics) to “clients” (active subjects who exercise their rights) that are committed to the processes that involve them.

---

***Title:***                      **Serious scarcity of water sources due to contamination, deforestation and, over-exploitation**

***Originator:***              Ramos

***Barrier description:***

- What is the barrier? Scarcity of water sources.
- Why is it important to overcome this barrier? In order to provide communities with adequate water and sanitation services that will result in improvements to health and standards of living.

***Importance:***

The lack of water in El Salvador will soon become a dangerous situation. Communities that own their water sources are struggling violently to maintain their resources and keep other communities from exploiting their water source (this is a social problem).

***How to overcome the barrier:***

- Enact legislation to regulate water resources.
- Include community participation in the planning process for water and sanitation programs and in the protection of water basins.
- Educate the public regarding the protection of their water resources.
- Use alternative methods for obtaining water suitable for human consumption (e.g., rainwater).
- Institute water conservation practices.





## **Inability to Save**

**ORIGINATORS:**

Rosasco on behalf of himself, Orozco, and Rivera

*The following barriers were subsumed under the above title:*

---

**Title:** Economic disability

**Originator:** Rosasco

***Barrier description:***

Families that earn less than US\$90.00 a month are unable to pay for safe water. The lack of revenue from users will affect the financing required for sustainability of small systems.

***Importance:***

Families in need require financial aid in order to afford safe water and sanitation services.

***How to overcome the barrier:***

Provide subsidy programs for families in need.

---

**Title:** Payment capacity from beneficiary

**Originator:** Orozco

***Barrier description:***

Small-scattered communities lack a large number of users and sufficient revenue streams that would permit a recovery of their investments or the ability to sustain the costs necessary for operation and maintenance of the system.

***Importance:***

- Hinders access to banking credit.
- Limits the level of technology used in the system because of an inability to repay.
- Endangers the sustainability of the system.

***How to overcome the barrier:***

- Increase community participation in all phases of developing the system.
  - Improve opportunities to generate revenue through comprehensive integrated planning.
- 

***Title:***                      **Direct financing to small communities**

***Originator:***              Rivera

***Barrier description:***

Every infrastructure project requires financing, whether it is reimbursable or not. It therefore becomes necessary to create procedures that will allow small communities to have access to financial resources.

***Importance:***

Community participation, through its requirements and its own projects, can make it possible for small communities to receive local financing from government resources or from multilateral entities. It is necessary that the technologies to be applied are compatible with the way in which the projects will be carried out without discarding the most recent technology that can be utilized.

***How to overcome the barrier:***

Create organizations that are in agreement with the reality of each country and that can manage the financial resources available to a project based on a Socio-economic evaluation conducted by an organization's work committee. In some cases, loans will be issued on a non-reimbursable basis; in other cases, loans will be repaid in full.

## **Considering Small Water Systems as a Separate Problem from Water Supply Generally Is a Barrier to Efficient Solution of Water Supply Generally**

**ORIGINATOR:**

Okun on behalf of himself

***Barrier description:***

Considering small systems separately limits the availability of loans and/or grants for water systems from external support agencies. World Bank and regional banks are interested in moving large amounts of money.

***Importance:***

Financial and technical resources are limited for small systems whereas regionalized systems that include small systems with large systems will help overcome this barrier.

***How to overcome the barrier:***

Modify national institutions to have small community water supply and sanitation systems integrated with urban systems.



## STRENGTH OF FEELING ANALYSIS OF PARTICIPANTS AND SUBGROUPS

The following five tables provide a quantitative sense of the degree of agreement (or lack of agreement) regarding barrier priorities between 29 individual participants as well as between participants comprising four subgroups. The four subgroups included federal/state organization participants, international organization participants, university participants, and private sector participants.

The strength of feeling tables show the number of times each impediment was chosen by a participant as well as the total number of points it received. A priority rank of one (highest) gives ten points to that particular impediment and a priority rank of ten (lowest on the ranking sheet) gives one point to the impediment. The strength of feeling expressed as a percentage assigns a numerical “grade” to the group’s unanimity (or lack of unanimity) for each impediment they ranked. For example, if every participant selected the same impediment as his or her highest priority then that impediment’s strength of feeling will be 100%. If nobody selected the impediment, then its strength of feeling will be zero. Intermediate strengths-of-feeling are computed by dividing the total number of points an impediment received on all the ranking sheets by the total number it could have possibly received (times 100) if each participant had selected it as his or her top priority.

**TABLE 1****All Barriers (32) Ranked by All Participants (29)**

<b>Rank</b>	<b>Title</b>	<b>Times Picked/Pts.</b>	<b>Strength Of Feeling</b>
1.	Absence of Institutional Capacity at Local, Regional, and National Government Levels for Addressing Water Supply Issues	20/140	48.3%
2.	Absence of Local Institutions to Sustain Local Water Supply Facilities	20/133	45.9%
3.	Absence of Commitment from Decision Makers on Appropriate Socio-Economic Development and the Establishment of Policies Strengthening Institutions, Programs, and Projects	15/109	37.6%
4.	Failure to Create Capability Among the Various Partners to Cooperate Effectively in the Delivery of Environmental Health Services in a Holistic Manner	15/106	36.6%
5.	Non-Availability of Timely Investment-Type Funding	16/93	32.1%
6.	Lack of Awareness Among Politicians, Decision Makers, and the Local Community	16/93	32.1%
7.	Lack of a Permanent Organization That Monitors and Provides Technical Assistance to the Communities That Administer Their Water System	14/78	26.9%
8.	Imposition of Programs and Projects to Be Implemented in the Community Without Considering This a Developing Subject	13/69	23.8%
9.	Lack of Appropriate Technology Solutions	13/63	21.7%
10.	Capacity of Payment of the Beneficiary	12/62	21.4%
11.	Availability of Relevant and Good Quality Information During the Entire Cycle of the Projects	13/61	21.0%
12.	Lack of Reference, Research, and Capacitation Centers	11/60	20.7%
13.	Different Interests Exist Between State Administrators and the Communities Regarding Solutions to Water Supply Problems	12/53	18.3%
14.	External Support Fails to Reflect Community Realities While Reflecting ESA's Priorities Contrary to Their Declared Policy	10/51	17.6%
15.	Users and Potential Users of Small Systems Are Not Adequately Empowered to Participate Effectively in the Democratic Processes	7/44	15.2%
16.	Strengthen the Capacity of the Answer at an Inter-Institutional Level and Interdisciplinary Level of the Potable Water Sector	7/42	14.5%

Rank	Title	Times Picked/Pts.	Strength Of Feeling
17.	Lack of Provisions of Appropriate Treatment in Many Small Water Systems	8/42	14.5%
18.	Lack of Clear, Firm, and Fair Regulatory and Enforcement Programs Dedicated to Drinking Water Quality and Source Water Protection	11/39	13.4%
19.	Poor Implementation of Monitoring Water Supplies and Limited Use of Information for Management	8/38	13.1%
20.	Willingness to Pay	8/33	11.4%
21.	Cost/Benefit of a System to Be Implemented	7/27	9.3%
22.	Failure to Value All Indirect Costs Associated with Contaminated Water, and Invest in Water Treatment at Levels Comparable to These Costs	4/24	8.3%
23.	Lack of Adequate Water Sources	6/22	7.6%
24.	Inability of the Central Government to Monitor the Quality of Water	4/22	7.6%
25.	Strong Paternal Heritage in Solving Local Problems	4/18	6.2%
26.	Conflicts Between Professional Engineering Authorities and Communities	3/15	5.2%
27.	Lack of Data Bases	2/14	4.8%
28.	Norms, Rules, and Standards That Are Not in Accordance with the Local Reality	4/14	4.8%
29.	Lack of Coordination Among Water Supply Programs and Projects	3/13	4.5%
30.	Contamination of Sources	2/10	3.4%
31.	Inability to Save	1/5	1.7%
32.	Considering Small Water Systems as a Separate Problem from Water Supply Generally Is a Barrier to Efficient Solution of Water Supply Generally	1/2	0.7%



**TABLE 2****All Barriers (32) Ranked by Federal/State Participants (12)**

<b>Rank</b>	<b>Title</b>	<b>Times Picked/Pts.</b>	<b>Strength Of Feeling</b>
1.	Absence of Commitment from Decision Makers on Appropriate Socio-Economic Development and the Establishment of Policies Strengthening Institutions, Programs, and Projects	9/69	57.5%
2.	Absence of Institutional Capacity at Local, Regional, and National Government Levels for Addressing Water Supply Issues	9/64	53.3%
3.	Failure to Create Capability Among the Various Partners to Cooperate Effectively in the Delivery of Environmental Health Services in a Holistic Manner	7/51	42.5%
4.	Non-Availability of Timely Investment-Type Funding	7/50	41.7%
5.	Lack of Awareness Among Politicians, Decision Makers, and the Local Community	7/40	33.3%
6.	Absence of Local Institutions to Sustain Local Water Supply Facilities	6/39	32.5%
7.	Different Interests Exist Between State Administrators and the Communities Regarding Solutions to Water Supply Problems	6/31	25.8%
8.	Capacity of Payment of the Beneficiary	5/27	22.5%
9.	Users and Potential Users of Small Systems Are Not Adequately Empowered to Participate Effectively in the Democratic Processes	4/27	22.5%
10.	Lack of a Permanent Organization That Monitors and Provides Technical Assistance to the Communities That Administer Their Water System	4/25	20.8%
11.	Lack of Appropriate Technology Solutions	5/25	20.8%
12.	Imposition of Programs and Projects to Be Implemented in the Community Without Considering This a Developing Subject	4/23	19.2%
13.	Lack of Reference, Research, and Capacitation Centers	6/22	18.3%
14.	Availability of Relevant and Good Quality Information During the Entire Cycle of the Projects	6/21	17.5%
15.	Poor Implementation of Monitoring Water Supplies and Limited Use of Information for Management	3/20	16.7%
16.	Lack of Clear, Firm, and Fair Regulatory and Enforcement Programs Dedicated to Drinking Water Quality and Source Water Protection	6/18	16.7%

<b>Rank</b>	<b>Title</b>	<b>Times Picked/Pts.</b>	<b>Strength Of Feeling</b>
17.	Lack of Provisions of Appropriate Treatment in Many Small Water Systems	3/17	14.2%
18.	Strengthen the Capacity of the Answer at an Inter-Institutional Level and Interdisciplinary Level of the Potable Water Sector	2/16	13.3%
19.	Conflicts Between Professional Engineering Authorities and Communities	2/11	9.2%
20.	Lack of Adequate Water Sources	3/11	9.2%
21.	Willingness to Pay	3/11	9.2%
22.	Strong Paternal Heritage in the Solving Local Problems	2/9	7.5%
23.	External Support Fails to Reflect Community Realities While Reflecting ESA's Priorities Contrary to Their Declared Policy	2/8	6.7%
24.	Contamination of Sources	1/7	5.8%
25.	Inability of the Central Government to Monitor the Quality of Water	2/6	5.0%
26.	Cost/Benefit of a System to Be Implemented	3/5	4.2%
27.	Lack of Data Bases	1/4	3.3%
28.	Norms, Rules, and Standards That Are Not in Accordance with the Local Reality	2/3	2.5%

**TABLE 3**

All Barriers (32) Ranked by International Organization Participants (11)

Rank	Title	Times Picked/Pts.	Strength Of Feeling
1.	Absence of Local Institutions to Sustain Local Water Supply Facilities	9/60	54.5%
2.	Absence of Institutional Capacity at Local, Regional, and National Government Levels for Addressing Water Supply Issues	8/52	47.3%
3.	Lack of Awareness Among Politicians, Decision Makers, and the Local Community	7/46	41.8%
4.	Failure to Create Capability Among the Various Partners to Cooperate Effectively in the Delivery of Environmental Health Services in a Holistic Manner	5/39	35.5%
5.	Lack of a Permanent Organization That Monitors and Provides Technical Assistance to the Communities That Administer Their Water System	6/37	33.6%
6.	Lack of Appropriate Technology Solutions	7/35	31.8%
7.	Absence of Commitment from Decision Makers on Appropriate Socio-Economic Development and the Establishment of Policies Strengthening Institutions, Programs, and Projects	5/34	30.9%
8.	Imposition of Programs and Projects to Be Implemented in the Community Without Considering This a Developing Subject	6/29	26.4%
9.	Strengthen the Capacity of the Answer at an Inter-Institutional Level and Interdisciplinary Level of the Potable Water Sector	5/26	23.6%
10.	External Support Fails to Reflect Community Realities While Reflecting ESA's Priorities Contrary to Their Declared Policy	5/25	22.7%
11.	Lack of Clear, Firm, and Fair Regulatory and Enforcement Programs Dedicated to Drinking Water Quality and Source Water Protection	5/21	19.1%
12.	Different Interests Exist Between State Administrators and the Communities Regarding Solutions to Water Supply Problems	5/20	18.2%
13.	Capacity of Payment of the Beneficiary	4/16	14.5%
14.	Inability of the Central Government to Monitor the Quality of Water	2/16	14.5%
15.	Lack of Reference, Research, and Capacitation Centers	2/15	13.6%
16.	Non-Availability of Timely Investment-Type Funding	2/14	12.7%

<b>Rank</b>	<b>Title</b>	<b>Times Picked/Pts.</b>	<b>Strength Of Feeling</b>
17.	Users and Potential Users of Small Systems Are Not Adequately Empowered to Participate Effectively in the Democratic Processes	2/12	10.9%
18.	Lack of Adequate Water Sources	3/11	10.0%
19.	Norms, Rules, and Standards That Are Not in Accordance with the Local Reality	2/11	10.0%
20.	Willingness to Pay	3/11	10.0%
21.	Availability of Relevant and Good Quality Information During the Entire Cycle of the Projects	2/10	9.1%
22.	Lack of Data Bases	1/10	9.1%
23.	Lack of Coordination Among Water Supply Programs and Projects	2/10	9.1%
24.	Strong Paternal Heritage in the Solving Local Problems	2/9	8.2%
25.	Cost/Benefit of a System to Be Implemented	2/8	7.3%
26.	Failure to Value All Indirect Costs Associated with Contaminated Water, and Invest in Water Treatment at Levels Comparable to These Costs	1/6	5.5%
27.	Poor Implementation of Monitoring Water Supplies and Limited Use of Information for Management	2/5	4.5%
28.	Inability to Save	1/5	4.5%
29.	Conflicts Between Professional Engineering Authorities and Communities	1/4	3.6%
30.	Lack of Provisions of Appropriate Treatment in Many Small Water Systems	1/3	2.7%
31.	Contamination of Sources	1/3	2.7%
32.	Considering Small Water Systems as a Separate Problem from Water Supply Generally Is a Barrier to Efficient Solution of Water Supply Generally	1/2	1.8%

**TABLE 4****All Barriers (32) Ranked by University Participants (3)**

<b>Rank</b>	<b>Title</b>	<b>Times Picked/Pts.</b>	<b>Strength Of Feeling</b>
1.	Absence of Institutional Capacity at Local, Regional, and National Government Levels for Addressing Water Supply Issues	3/24	80%
2.	Absence of Local Institutions to Sustain Local Water Supply Facilities	2/20	66.7%
3.	External Support Fails to Reflect Community Realities While Reflecting ESA's Priorities Contrary to Their Declared Policy	3/18	60%
4.	Lack of Reference, Research, and Capacitation Centers	2/15	50%
5.	Capacity of Payment of the Beneficiary	2/12	40%
6.	Imposition of Programs and Projects to Be Implemented in the Community Without Considering This a Developing Subject	2/12	40%
7.	Poor Implementation of Monitoring Water Supplies and Limited Use of Information for Management	2/12	40%
8.	Failure to Create Capability Among the Various Partners to Cooperate Effectively in the Delivery of Environmental Health Services in a Holistic Manner	2/11	36.7%
9.	Lack of a Permanent Organization That Monitors and Provides Technical Assistance to the Communities That Administer Their Water System	2/11	36.7%
10.	Availability of Relevant and Good Quality Information During the Entire Cycle of the Projects	2/9	30%
11.	Lack of Awareness Among Politicians, Decision Makers, and the Local Community	2/7	23.3%
12.	Non-Availability of Timely Investment-Type Funding	3/5	16.7%
13.	Users and Potential Users of Small Systems Are Not Adequately Empowered to Participate Effectively in the Democratic Processes	1/5	16.7%
14.	Lack of Provisions of Appropriate Treatment in Many Small Water Systems	2/4	13.3%

**TABLE 5****All Barriers (32) Ranked by Private Sector Participants (3)**

<b>Rank</b>	<b>Title</b>	<b>Times Picked/Pts.</b>	<b>Strength Of Feeling</b>
1.	Non-Availability of Timely Investment-Type Funding	3/24	80.0%
2.	Availability of Relevant and Good Quality Information During the Entire Cycle of the Projects	3/21	70.0%
3.	Lack of Provisions of Appropriate Treatment in Many Small Water Systems	2/18	60.0%
4.	Failure to Value All Indirect Costs Associated with Contaminated Water, and Invest in Water Treatment at Levels Comparable to These Costs	3/18	60.0%
5.	Absence of Local Institutions to Sustain Local Water Supply Facilities	3/14	46.7%
6.	Cost/Benefit of a System to Be Implemented	2/14	46.7%
7.	Willingness to Pay	2/11	36.7%
8.	Lack of Reference, Research, and Capacitation Centers	1/8	26.7%
9.	Capacity of Payment of the Beneficiary	1/7	23.3%
10.	Absence of Commitment from Decision Makers on Appropriate Socio-Economic Development and the Establishment of Policies Strengthening Institutions, Programs, and Projects	1/6	20.0%
11.	Failure to Create Capability Among the Various Partners to Cooperate Effectively in the Delivery of Environmental Health Services in a Holistic Manner	1/5	16.7%
12.	Imposition of Programs and Projects to Be Implemented in the Community Without Considering This a Developing Subject	1/5	16.7%
13.	Lack of a Permanent Organization That Monitors and Provides Technical Assistance to the Communities That Administer Their Water System	2/5	16.7%
14.	Lack of Coordination Among Water Supply Programs and Projects	1/3	10.0%
15.	Lack of Appropriate Technology Solutions	1/3	10%
16.	Different Interests Exist Between State Administrators and the Communities Regarding Solutions to Water Supply Problems	1/2	6.7%
17.	Poor Implementation of Monitoring Water Supplies and Limited Use of Information for Management	1/1	3.3%



## APPENDICES





## **APPENDIX A**

### **GLOSSARY OF ABBREVIATIONS AND ACRONYMS**

ESA	External Support Agencies
IMF	International Monetary Fund
NGO	Non-Government Organization
NGT	Nominal Group Technique
NSFI	National Sanitation Foundation International
NWRI	National Water Research Institute
O & M	Operations and Maintenance
PAHO	Pan American Health Organization
WB	World Bank

## APPENDIX B

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