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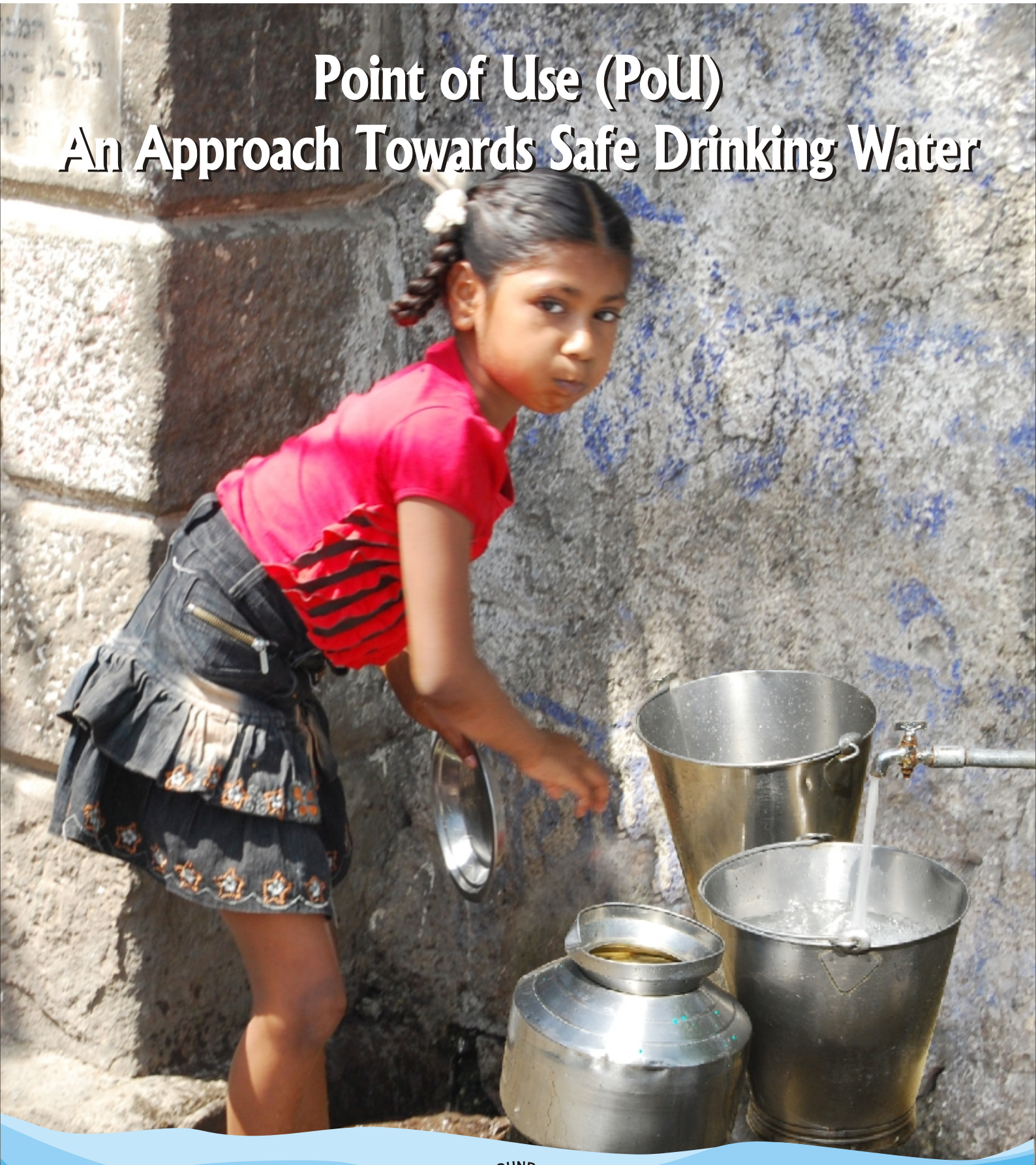
Health of the Urban Poor

Point of Use (PoU)
An Approach Towards Safe Drinking Water



POPULATION FOUNDATION OF INDIA

Point of Use (PoU): An Approach Towards Safe Drinking Water

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Preface

Water is the most essential human need. The provision of safe drinking water alone can reduce the burden of disease and contribute towards enhancing productivity and reducing poverty.

Diarrhea tops the three causes of child mortality worldwide; about 88 percent of diarrheal deaths occur due to unsafe water, inadequate sanitation, and poor hygiene.

In India, diarrhea is a major killer and about 1,000 children die every single day due to diarrhea[1]. Despite huge public sector investments in the water and sanitation sector, the improvement in the situation remains marginal. Even with a significantly high economic growth rate, the reported 10 million cases of diarrhea and about half a million cases of diarrheal deaths of children every year are issues of serious concern.

Several factors are responsible for this disheartening picture. These include untreated waste disposal, crude dumping of industrial and domestic waste, surface water runoff from agricultural fields, natural contamination, and, fecal contamination, the most serious threat to water quality. Despite several protection methods, water can be contaminated at source (even if defined as a safe source of water) as well as at the Point of Use (PoU).

In addition to the above factors, unhygienic living conditions and unhygienic behavior, including water handling practices, affect the quality of water. The urban poor and those living in slums are the most vulnerable to water quality and waterborne diseases. It seems rather alarming that water at PoU is more contaminated when compared to water at source.

Factors such as awareness (about cause and effect), acceptance (about situation and practices), affordability (of the available informed choices and options) and adoptability (of the available solutions) also affect water quality at the household level of the urban poor.

Water disinfection at PoU is an approach towards safe drinking water for the urban poor. It includes peoples' education through information sharing, demonstration and interaction about available options to improve water quality at the household level.

Health of the Urban Poor (HUP) Program and Population Foundation of India (PFI) organized a four day training program on PoU in four cities Delhi, Jaipur, Bhubaneswar and Pune in collaboration with PRATINIDHI.

This report is based on the training provided by the facilitating organization for mass dissemination of information and practices.

Dr. Sainath Banerjee
Chief of Party, HUP

Context and Background

Water and sanitation are essential human needs. In India, 70-80 percent of morbidity is related to water contamination, unsafe sanitation practices, unhygienic environmental conditions and ignorance in matters of personal hygiene[2].

Box 1: Lack of Access to Safe Water - Some Facts

- 1.1 billion people in the world do not have access to safe drinking water, roughly one-sixth of the world's population.
- 2.2 million people in developing countries, most of them children, die every year from diseases associated with lack of access to safe drinking water, inadequate sanitation, and poor hygiene.
- Half of the world's hospital beds are filled with people suffering from water-related illnesses.
- In the past 10 years, diarrhea has killed more children than all the people lost to armed conflict since World War II.
- There were only 181 million fewer people living without safe drinking water in rural settings in 2004 (899 million) vs. 1990 (1.08 billion).
- 50 percent of people on earth lack adequate sanitation.
- Some 6,000 children die every day from diseases associated with lack of access to safe drinking water, inadequate sanitation and poor hygiene, equivalent to 20 jumbo jets crashing every day.
- The average distance that women in Africa and Asia walk to collect water is 6 km.
- Tens of millions of children cannot go to school as they must fetch water every day. Dropout rates for adolescent girls, who even make it that far, skyrocket once they hit puberty, as there are no private sanitation facilities at their schools.
- 80 percent of diseases in the developing world are caused by contaminated water.
- Waterborne diseases cost the Indian economy 73 million working days per year.
- If we did nothing other than provide access to clean water, without any other medical intervention, we could save 2 million lives a year.
- The water and sanitation crisis claims more lives through disease than any war claims through guns.

Source: www.water.org

Diarrhea heads the list of top three causes of child mortality worldwide. It leads to millions of deaths among children under the age of five. Despite the existence of inexpensive and efficient means of treatment, diarrhea kills more children than HIV/AIDS, malaria, and measles combined. According to a report issued in October 2009 by UNICEF and the World Health Organization (WHO)[3]:

> *In the developing world, 24,000 children under the age of five die every day from preventable causes like diarrhea. It is truly a tragedy that these deaths take place since inexpensive and effective treatments for diarrhea already exist. (UNICEF/WHO 2009)*

About 88 percent of diarrheal deaths worldwide are attributable to unsafe water, inadequate sanitation, and poor hygiene. In India, diarrhea kills about 1,000 children below the age of five years every day. There is an urgent need to shift attention and resources back to treating and preventing diarrhea.

India is one of the fastest growing economies in the world and is urbanizing at a rapid pace. Its urban population growth is about two times of its overall population growth. In a country of more than 1,210 million people, 31.16 percent (377 million) comprise the urban population[4]. Rapid urbanization, clubbed with other factors like natural calamities and rural-to-urban migration of people in search of gainful employment opportunities or means of survival, contributes toward a significant increase in slums, especially informal human settlements and slum population in urban areas. The population growth trend analysis indicates that in most cities slum population growth is higher than urban population growth, which is higher than the rural population growth.

A faster pace of urban population growth has resulted in higher poverty concentration in urban centers. Estimates for 2004-5, with some revisions in the methodology for setting the poverty line, suggested 25.7 percent of urban people falls below the poverty line. Despite achieving a higher economic growth rate, more than 20 million urban poor were added from 1973-74 to 2004-5. Poverty assessment procedure and methods for declaration of poverty line is facing resistance from almost all sections of the society and according to the recent estimates of Planning

Commission 20.9 percent of the urban people are below poverty line.[5] Though the percentage of the urban poor has gone down, there is an increase in the absolute number.

The relationship between poverty and poor health is well established. In addition to loss of productivity due to high morbidity, direct financial consequences, including sudden increase in expenditure and debt trap to meet health and other survival-related expenditure, multiply the vulnerability of the urban poor.

The provision of safe drinking water is a fundamental right under Article 21 of the Indian Constitution and is therefore, a national objective. Despite significant public sector investments in the water and sanitation sector, the situation has not improved, especially in terms of reducing water-related morbidity and mortality. Various studies reveals that people living in slums and slum-like conditions face unprecedented challenges in meeting their safe drinking water needs and that provision of basic services including water is generally linked to tenure status.

The national objectives of reducing morbidity and mortality largely depend on the reduction of diarrhea, jaundice, etc. Communicable diseases, like tuberculosis, malaria, kala-azar, dengue fever, chikungunya and other vector borne diseases, and water-borne diseases like cholera, diarrhoeal diseases, leptospirosis etc, continue to be a major public health problem in India. In fact, diarrhoeal diseases, respiratory infections, tuberculosis and malaria cause about one quarter of all deaths in the country. (Report of the working group on disease burden for the 12th Five Year Plan, 2011[6])

The burden of waterborne diseases cannot be reduced without ensuring access to, and availability of safe drinking water at the household level. Point of Use (PoU) methods of water disinfection is one such approach that reduces the burden of waterborne diseases and thus contributes toward reducing poverty.

Conceptual Framework and Utility of PoU Model

It is reported that 95 percent of urban households have access to improved source of water[7] and access to improved source of water is not a reflection of the availability of safe drinking water. According to Census 2011 reports, in India, 62.0 percent urban households get tap water from a treated source and 8.6 percent urban households get tap water from an untreated source. It is also reported that approximately 10 million diarrhea cases are reported each year (Planning Commission 2008), about half a million children die every year due to water-related diseases, and about 80 percent of morbidity is related to water contamination. As per NFHS-III 8.9 percent of the urban children under age five years with reported diarrhea (two weeks preceding the survey) . The burden of disease[8] study by HUP in 2011 shows that malaria, diarrhea, dengue were among the most commonly suffered infection. Diarrhea ranked third in Pune, first in Bhubaneswar and fifth in Jaipur among the major cause of hospitalisation.

There are several causes of surface water and groundwater contamination including crude dumping of municipal solid waste, untreated disposal of sewage water, crude disposal of industrial effluents, natural contamination,

Box 2: Factors Responsible for Water Contamination

- Latrines near the source of water.
- Latrines upstream from the source of water.
- Other potential sources of fecal contamination near or upstream from the source (for example, open defecation, septic tanks, cesspools, garbage leachates, etc.)
- Stagnant water at or near the water source.
- Poorly constructed or maintained sewer lines.
- Waterlogging.
- Groundwater source inadequately protected from contamination. For instance, hand pumps with broken platforms.
- Surface water intake inadequately protected from local sources of contamination (for example, no fencing, broken fencing, poorly constructed or damaged intake structures, inadequate screening).
- Infrequent cleaning or non-cleaning of water tanks.
- Improper or unhygienic handling of water.
- Animals with access to the water source.

etc. The most serious threat to water quality in surface water and groundwater systems is fecal contamination. Despite providing safe drinking water at source there is a possibility of it being contaminated by the time it reaches the intended users.

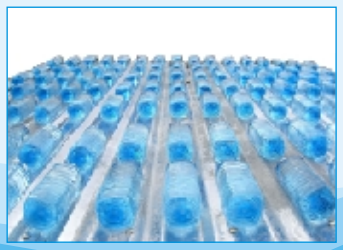
PoU water purification helps to improve water quality at the household level. PoU water treatment refers to a variety of different water treatment methods (including physical and biological) used to improve water quality for intended use (drinking and cooking and other human needs) at the point of consumption instead of at a centralized scale (involving a distribution network).

Common PoU treatment methods include either one or a combination of the following methods meant for water purification at household levels.

Boiling	**Water filters**
Solar Disinfection (SODIS)	**Chlorination**

It is estimated that about 68 percent of the total population and more than half of the urban population[9] do not use any method of water purification at the household level due to various reasons including the following.

- People don't believe their drinking water source is unsafe.
- Some of the purification methods alter the taste and smell of water.
- Even if water is purified, storage of water may be improper and this leads to re-contamination.
- Regular supply of water is not available.
- There is limited availability, accessibility, and affordability of commercial products used for water purification.
- Instructions on use of water purification products are often complicated and hence not clearly understood.
- Chlorine products are sometimes or often sold diluted or with inconsistent concentration of chlorine.
- There are varieties of technologies available and it is difficult to evaluate options.



- Boiling water is inconvenient, alters the taste, and consumes too much cooking gas/fuel.

Capacity Building Process on PoU Water Disinfection Method

PoU water disinfection is a process oriented method which includes capacity building of various stakeholders, educating community level health service providers, awareness generation, problem realization and suggesting solutions. Identification and listing of the stakeholders including Anganwadi Workers (AWWs), Urban Accredited Social Health Activist (ASHA) community leaders, leaders of women's Self Help Groups (SHGs) and other community institutions, etc., is advisable in order to support slum visits and house-to-house contact before the structured training program.

A structured participatory training program comprises classroom sessions, slum visits, demonstrations, door-to-door campaigns and open discussions for sharing experiences. All of these are organized for the development of master trainers on PoU. Generally, the four-day training program is divided into various sessions to facilitate step-by-step learning of participants, followed by a review meeting for consensus building on future action points.

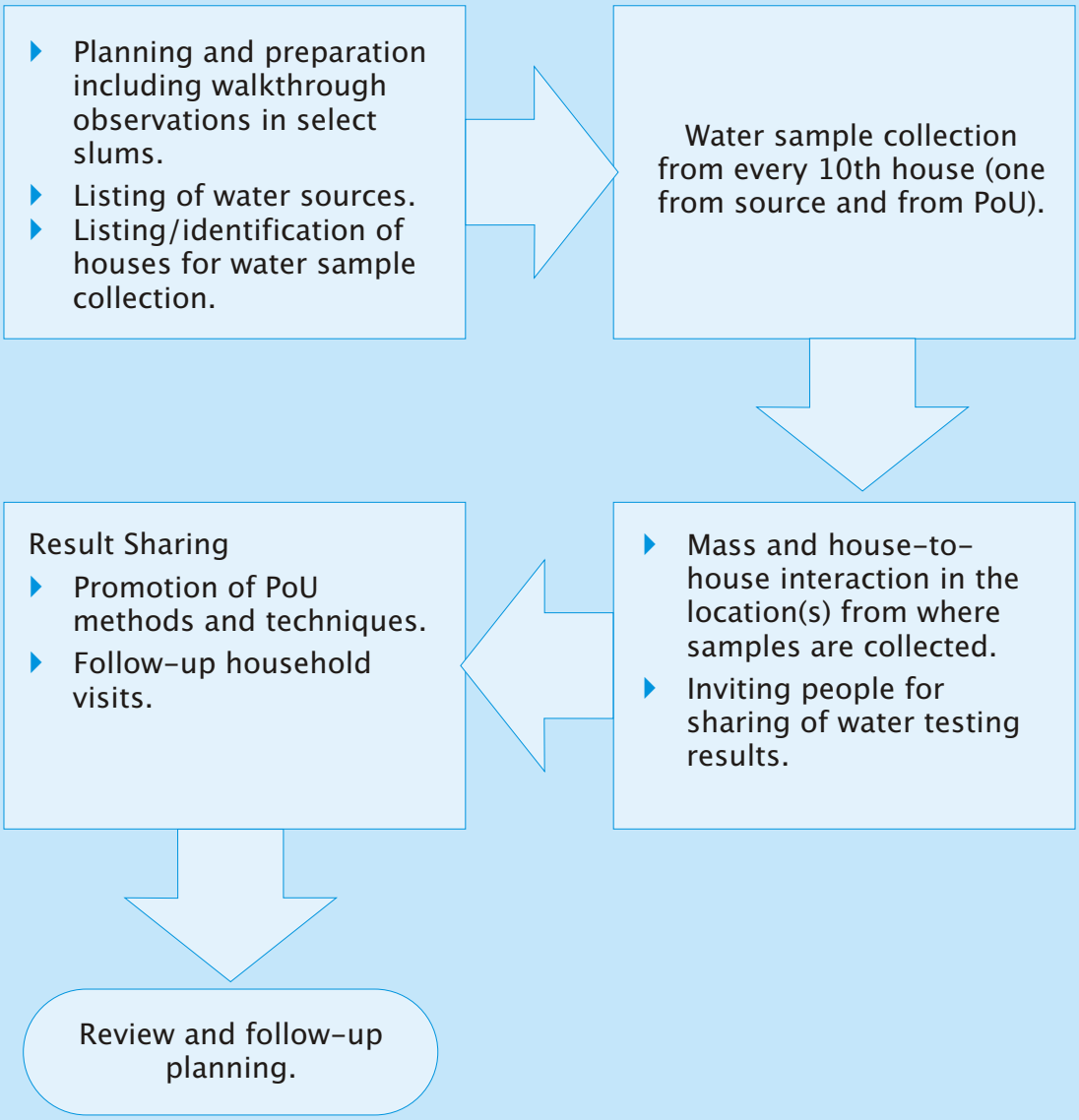
The division of the four-day training program into different sessions is presented in Table 1 below.

Table 1: PoU Training Program

Day	Session	Main Content / Activities
Day 0	▸ Planning & preparation of activities for the next days. ▸ Walkthrough observations in selected slums.	▸ Discussion on context. ▸ Objectives of the training. ▸ Concept & approach of PoU. ▸ Experiences and learning sharing. ▸ Identification of drinking water sources in the locality for water testing. ▸ Identification/selection of households for water testing. ▸ Orientation on effective communication for awareness generation.
Day 1	Water testing	▸ Two water samples, one from the source and the other from the point of storage (PoU) are collected from every 10th house of the selected location. ▸ Public address about the purpose of the process and distribution of information brochures, etc. ▸ Sharing experiences of the household visits.
Day 2	Community interaction	▸ Rally covering selected locations. ▸ House-to-house visits to share the purpose of program. Invite the people to participate in the "water testing result sharing" event planned for the next day.
Day 3	▸ Sharing and interaction with the community. ▸ Review	▸ Sharing the water testing results. ▸ Sharing the promotion of PoU techniques. ▸ Follow-up household visits. ▸ Review of the program and planning for way forward.

The activities of the four days are logically linked and helpful for participants to understand and promote the PoU disinfection method. The process flow chart of the training program is given below (Box 3).

Box 3: Flowchart on the PoU Water Disinfection Training Process



PoU Training by HUP: Experiences in Different Cities

HUP-PFI, in collaboration with PRATINIDHI, had organized training programs on PoU water disinfection in four cities: Delhi, Jaipur, Bhubaneswar and Pune for its partner non-governmental organizations (NGOs) in 2011. Besides community workers and partner NGOs of HUP under City Demonstration Programs, AWWs, ASHAs, Auxiliary Nurse Midwives (ANMs), representatives of municipal

corporations, the Public Health Engineering Organization, health and urban development department, water and sanitation specialists of HUP, etc. participated in the four-day training program.

The training was conducted using the design presented in Box 3. Water sample collection, water testing, and sharing of the water test result is one of the key strategies under the promotion of PoU water disinfection methods. As per the design of the program, two water samples (one from the water source and one from the point of storage or PoU) were collected from the sample households of the selected slum location and tested, the results of which is presented in Table 2 below.

Table 2: Summarized Water Testing Results of Four Cities

Reported Contamination (% of sample collected)	Delhi	Jaipur	Bhubaneswar	Pune
At Source	45	40	43	11
At POU	65	55	65	42

As the Table 2 shows there is a marked differentiation in the percentage of water contamination at Point of Source and Point of Use in all four cities. The average difference in the water contamination at Point-of-Source and Point -of-Use is more than 22%.

Sharing the results of the water test samples with the causes of water contamination at PoU along with the implications of consuming contaminated water in a large gathering (including community) proved to be an effective tool for sensitizing the community towards PoU disinfection. It has also proved to be an effective mechanism of behavior change communication.

During the discussion and interaction, the community was informed about the various available, affordable and cost-effective methods of PoU disinfection.

Besides the concerned community workers and community members, government officials were also invited to the programs. Several suggestions came up for the promotion of PoU for providing safe water at the household level.

The overall key suggestions and recommendations for further action provided by the concerned government officials to facilitate PoU disinfection include the following:

- The Public Health Engineering Department (PHED) and HUP can work together to mobilize the community and promote water and sanitation (WATSAN) in Rajasthan. Training can be organized for another two to five slums on PoU in convergence with PHED.

- Water testing is a priority for the PHED. The HUP can help in developing a common Management Information System (MIS) on issues for the PHED, the Health and Family Welfare department (Ministry of Health and Family Welfare), and Intergrated Child Development Services (ICDS) department. The health and family welfare department can also help in providing chlorine tablets to the community.
- Similar trainings may be conducted in other slums of the city, with an economically viable model in order to create awareness on safe drinking water among the slum dwellers.
- In Odisha it was felt that water treatment at both source and PoU needs to be promoted concurrently.
- Front line workers like AWW, ASHA, ANM and community organizers can be trained and assigned to sensitize community members on safe water, sanitation, and hygiene during their regular visit to slums.
- Sanitary surveys to assess the environmental vulnerability of water sources can be initiated in the city.
- A leverage plan can be developed to strengthen the initiatives to provide safe drinking water and its proper utilization at the community level[10].
- Training of Trainers (TOT) as formal training input for staff members of all implementing agencies[11].

Besides other suggestions, a doable action plan was prepared in Bhubaneswar city during the review meeting. It included the following:

- Mapping of the water sources in Bhubaneswar city.
- Mapping of organizations and individuals associated with water management in cities in Odisha.
- Capacity building of front line workers of women and child development, health and family welfare, housing and urban development on safe water, sanitation, and hygiene.
- Involvement of community-based organizations (CBOs), like the Mahila Mandals, youth clubs, etc., in tracking the entire process of water disinfection at PoU.

- Sensitization programs using various information, education and communication (IEC) materials and activities in collaboration with government departments[12].

Adopted Training Process

HUP-PFI, in collaboration with PRATINIDHI, had organized four-day structured training programs on PoU water disinfection in four cities: Delhi, Jaipur, Bhubaneswar, and Pune in 2011. The adopted training process is given below.

1. Objective Setting and Planning

1.1 Context & Objective Setting

- Presentation and discussion on overall scenario of urban water, sanitation and hygiene (WASH) and vulnerability of the urban poor.
- Discussing the burden of waterborne diseases and importance of safe water in reducing the burden of diseases.
- Presenting the objectives of the workshop.
- Contextualization of the workshop objectives with HUP objectives.
- Listing of the participants' expectations.
- Discussing the concept and importance of PoU methods.

1.2 Participatory Planning & Preparation for Next Three Days

- Consultation on water and health-related issues.
- Walkthrough observation in selected slum locations for identification and listing of water source, water supply timing, identification of houses for sample collection.
- Deliberation on sample collection techniques.
- Developing interpersonal communication skills.

2. House-to-House Visits for Sample Collection

- Meeting with community leaders and local service providers to plan the sample collection from the entire cluster.
- Forming teams to cover 10 percent households in the sample collection.
- Collecting two water samples from each sample household—one from source and one from PoU.
- Use of IEC materials for environment building and awareness generation.

3. House-to-House and Mass Contact

- Participants gathered at pre decided point for house-to-house contact in the selected locations.
- Start rally for publicity and awareness generation using placards, banners, and other attractive materials including puppets, etc.
- Contact every household and invite them for water testing result sharing.

4. Sharing of Water Testing Results

- Follow-up with the community members for ensuring their participation during water testing result sharing.

- Sharing of the results.
- Discussion on causes and effects of water contamination.
- Sharing of various available options of PoU water disinfection.
- Follow-up household visits after the demonstration exercise.

5. Review Meeting and Follow-up Planning

- Review and reflect on the proceedings and findings of the entire training program in the presence of concerned government functionaries.
- Preparation of a doable collaborative action plan for providing safe drinking water to the urban poor households.

Box 4: PoU Points to Remember

1. Wash hands with soap before filling water and use clean bucket or pitcher to store water.
2. Cover the bucket or pitcher after filling the water and do not dip finger in the drinking water.
3. Use handled pot to get drinking water from the pitcher or bucket.
4. Use platform or table to store drinking water above the ground level.

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12 HUP Training report on point of use in Delhi, August 2011.

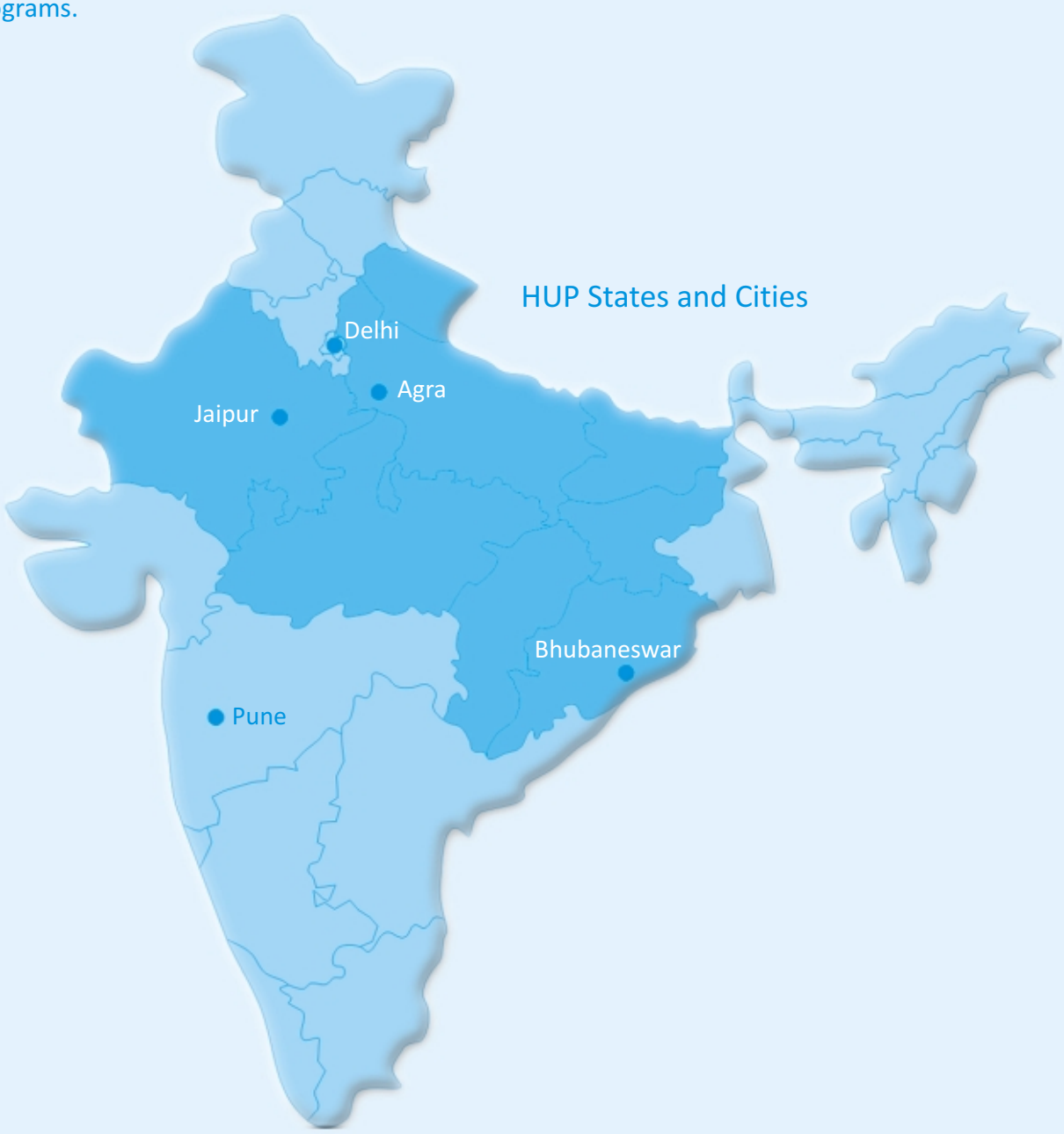
Health of the Urban Poor (HUP) Program

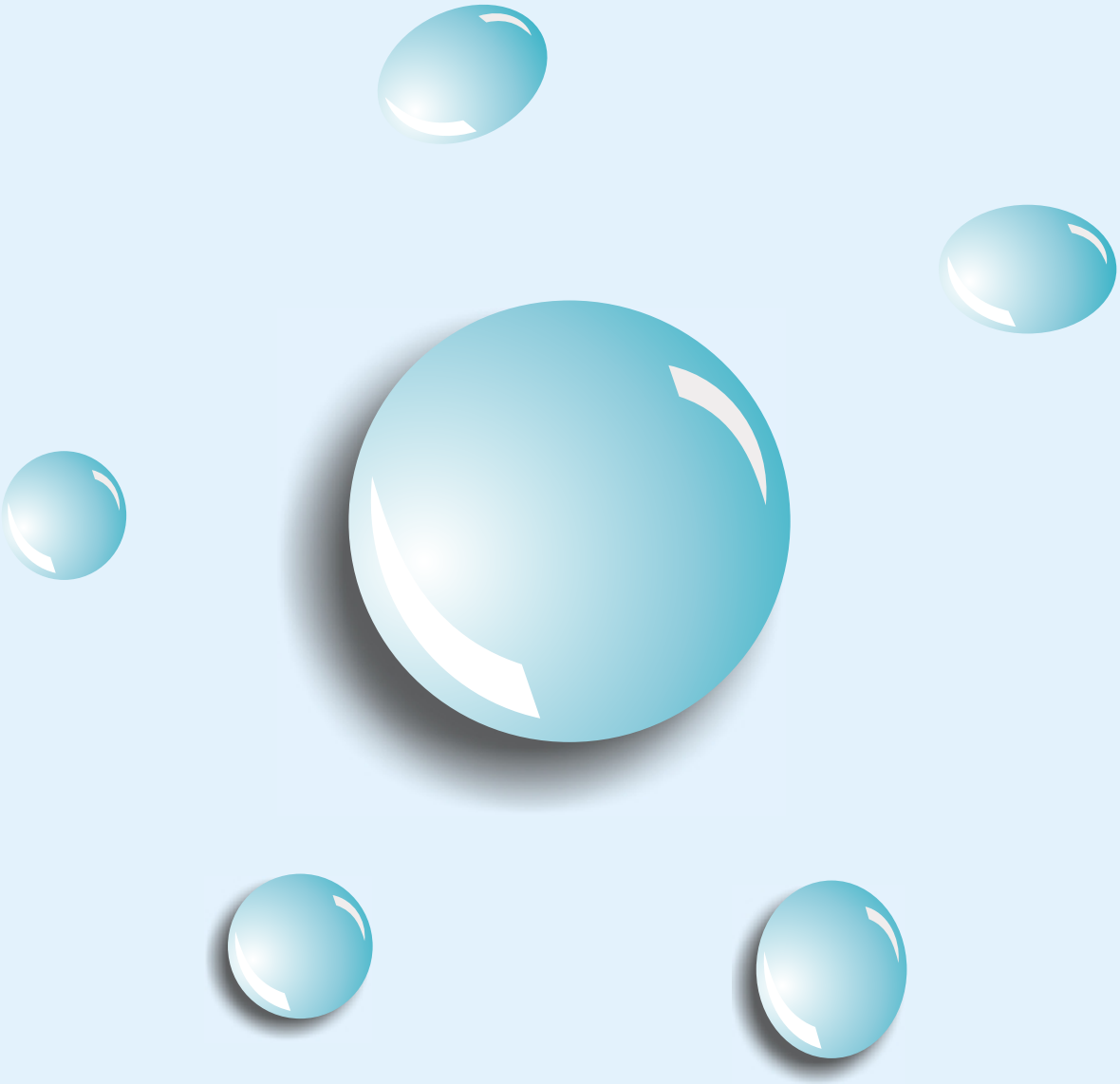
Vision

A responsive, functional, and sustainable health system that provides need based, affordable and accessible quality health care, improved water, sanitation and hygiene for urban poor in eight states.

Goal

To improve the health status of the urban poor by adopting effective, efficient and sustainable strategic intervention approaches, adopting the principle of convergence of the various development programs.





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