

## Household Water Treatment and Safe Storage (HWTS) Implementation Case Study: Piyush Chlorine Solution in Nepal



### Program Details

**Lead Organization:** Environment and Public Health Organization (ENPHO)

**Product/Technology:** Piyush Chlorine Solution

**Dates:** 1994–2017 (ongoing)

**Bottles Distributed:** Nearly 3 million as of early 2017









### Program Overview:

ENPHO is a local nonprofit, nongovernmental organization (NGO) that has operated in Nepal since 1990. ENPHO contributes to community development by developing, demonstrating, and disseminating appropriate technologies for healthy and environmentally friendly living.

In 1994, ENPHO responded to a cholera epidemic among Bhutanese refugees living in rural eastern Nepal. ENPHO conducted a rapid assessment, concluded that chlorine solution was the most appropriate water treatment option, and provided it to the refugees. ENPHO staff soon realized that the chlorine solution had potential for wider use in the general population. ENPHO registered its chlorine product with the brand name *Piyush*, a Sanskrit word meaning “drink of the Gods.” The organization began producing Piyush and selling it through pharmacy distributors in Kathmandu.

Piyush played a vital role in preventing waterborne diseases in the districts affected by the April 2015 earthquake. ENPHO, along with volunteer teams and other NGOs, produced and distributed hundreds of thousands of Piyush bottles for earthquake victims. In non-emergency settings, however, demand and sales for Piyush are often low. To make Piyush more widely available in the market, ENPHO recently transferred responsibility for Piyush production and distribution to a social enterprise, Eco Concern Pvt. Ltd. (EcoConcern).

### Who’s Engaged?

| Group / Organization  | Creating Demand   | Supplying Products & Services   | Monitoring for Improvement   | Financing   | Building Capacity   |
|---|---|---|--|---|---|
|  |  |  |  |  |  |
| ENPHO   | ✓   | ✓   | ✓  | ✓   | ✓   |
| Pharmaceutical Distributors   | ✓   | ✓   |  |   |   |
| Eco Concern Pvt Ltd. (EcoConcern)   | ✓   | ✓   | ✓  | ✓   | ✓   |
| External Funders  |   |   |  | ✓   |   |
| Other Implementing Organizations  | ✓   | ✓   |  | ✓   |   |

## Case Study Details



### Creating Demand

From 1994 until 2000, Piyush had a low profile in the market. Without financial support from private donors or government, ENPHO used its internal budget for Piyush promotion activities, estimated at NPR 80,000-100,000/year (about US\$1200/year). ENPHO could only afford to print some leaflets and promote Piyush through training programs. Demand for Piyush was low, and most Nepalis were not aware of the product.

In 2000, ENPHO received funding for household water treatment and safe storage (HWTS) promotion. This allowed them to:

- Develop additional education and communication materials on Piyush
- Conduct Piyush training sessions for schools, community associations, health clinics, and local governments
- Promote Piyush through mass media, exhibitions, and conferences



Piyush promotional billboard (2010)

Starting in 2006, the Government of Nepal coordinated with international and local development agencies to promote various HWTS options throughout the country. These options included boiling, solar disinfection (SODIS), filtration, and chlorination. This raised the profile of Piyush and other chlorine products.

From 2006 onwards, ENPHO began selling Piyush through medical distributors and retail outlets at nominal cost. As its popularity increased, the Piyush brand became a synonym for chlorine solution used for drinking water treatment in the country.

Demand for Piyush also increased because of massive distribution efforts during epidemics and disasters. ENPHO and other organizations distributed thousands of Piyush bottles during emergencies. When responding to disasters in Nepal, many national and international organizations included Piyush as a water purifier in the hygiene kits they distributed. For example, UNICEF distributed Piyush after the 2015 earthquake and during

the 2016 cholera outbreak in Kathmandu Valley. These events increased public awareness of the Piyush brand.

### Challenges and Lessons Learned: Creating Demand

- Piyush is often distributed for free through NGO programs during emergencies and disease outbreaks. As a result, households now assume that Piyush will come to them for free when necessary. This reduces their willingness to find and pay for the product regularly.
- Increased demand during an emergency does not always translate to sustained demand when the emergency ends. Piyush is sold mostly through pharmacies, and people view it as a medicine to be used temporarily, during the rainy season or when episodes of cholera or

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other waterborne diseases are featured in the news. ENPHO recently signed an agreement with EcoConcern, a social business, to produce and market Piyush throughout Nepal. ENPHO hopes that EcoConcern will use its marketing expertise to help people see Piyush as a product necessary for daily life, and to make Piyush available in grocery stores alongside other daily goods.

- There are numerous household water treatment options available in Nepal. Some options, such as imported ceramic and electric filters and locally made biosand filters, are popular among middle-income households. Many people boil water for drinking. A few households use inexpensive methods such as SODIS. Unless there is an emergency, there is often low interest among shopkeepers to sell Piyush, and among consumers to buy it.
- Setting a price that customers are willing to pay is challenging. This is partly due to government regulations and taxes. The government of Nepal classifies Piyush as a “non-essential cosmetic good,” which means consumers must pay an extra 13% in taxes on each bottle of Piyush. ENPHO prefers to keep the price of Piyush as low as possible to make it affordable to a larger population.



Production of Piyush during emergency (post-2015 earthquake)



### Supplying Products and Services

#### Producing Piyush

Until December 2016, ENPHO produced and packaged Piyush in its office premises. There are now plans to move Piyush operations to a location with more space for storage and production.

Initially, Piyush was produced using electricity and salt (sodium chloride). However, electricity was unreliable and expensive in Kathmandu, and the solution degraded quickly. This resulted in a product that was expensive to make and had a short shelf life. ENPHO soon began using locally available bleach solution and diluting it to required chlorine concentrations. This approach proved to be more efficient and reliable.



Piyush production (unknown year)

EcoConcern has now taken responsibility for Piyush production and distribution, and they continue to use the chlorine bleach approach. Purchased liquid bleach is first tested at the on-



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Applying labels to Piyush bottles (2015)

site accredited laboratory and then diluted to achieve the appropriate concentration for different Piyush products:

- Piyush: 0.5% chlorine in 60 mL bottles. This solution is sold for household use.
- Piyush+: 0.7% chlorine in 240 mL bottles. This version is for customers who need to treat larger volumes of water.
- Piyush++: 1% chlorine solution in 1 L bottles. EcoConcern produces this solution, when requested, for institutional use (for example, hospitals and hotels).

EcoConcern staff package, label, seal, and date each Piyush bottle manually. Each 60 mL Piyush bottle can treat 400 litres of water, enough for an average family of four or five people to use for one to two months. The normal production capacity is about 1,000 bottles per day. During peak season and in emergencies, EcoConcern can produce up to 5,000 bottles per day by operating on an

extended schedule and using extra human resources. Outside peak season, they manufacture Piyush on demand, and can fill an order within a few days.

### Distributing Piyush

Piyush is sold through two distinct channels:

1. About 40% of the product is sold in bulk directly to institutional buyers such as UNICEF, other NGOs, or community groups. Most of these sales are for emergency response.
2. All other sales occur through large wholesale distributors of medical supplies.

Using wholesale distributors has been ENPHO's main sales strategy for over 15 years. Initially, ENPHO sold Piyush directly to a few pharmacies. In 2001, ENPHO signed an agreement with New Loyal Medicine Distributor, one of the largest medical suppliers in Kathmandu. New Loyal Medicine Distributor became the exclusive sales representative for Piyush, selling the product through their network of regional distributors, more than 800 pharmacies, and some retail shops within the Kathmandu Valley. In 2009, ENPHO selected Nepal CRS Company, a nonprofit social marketing organization, to be the sole distributor of Piyush in the country. Nepal CRS Company has a distribution network that reaches across all of Nepal.

In 2016, EcoConcern took over responsibility for producing and marketing Piyush and other ENPHO products on a commercial scale. EcoConcern will continue to supply Piyush through medical distributors and pharmacies. It is also planning to distribute Piyush through grocery distributors and retail shops, where consumers purchase other goods for everyday life.

The price of Piyush is jointly reviewed by ENPHO and EcoConcern on a regular basis. At present, ENPHO receives a fixed royalty and a share of the profit from each sale of Piyush. The

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maximum retail price of Piyush is NPR 25 (about US\$0.25). This is about the same price as one bottle of drinking water in the market.

### Challenges and Lessons Learned: Supplying Products and Services

- Producing and packaging Piyush by hand is tedious and has high labour costs. EcoConcern would like to address this issue by shifting to a mechanized production system, but such an investment would be expensive.
- The difficult terrain in the country makes transportation of Piyush expensive. EcoConcern is looking into more cost-effective methods for transporting Piyush throughout Nepal.
- Due to low profit margins and low sales volumes (often a few Piyush bottles per month per shop outside peak season), many shops are not interested in stocking Piyush year-round. Shopkeepers are sometimes reluctant to display Piyush in prominent positions within their shops. EcoConcern is currently creating a strategy to address challenges related to selling Piyush through local stores.



### Monitoring for Improvement

#### Monitoring of Production

EcoConcern works in ENPHO's on-site accredited laboratory to test the chlorine solution, ensure product quality control, and conduct research and product development. Staff members follow standard operating procedures and check the concentration of chlorine for every batch before bottling. Strict control measures are used during production to ensure the highest possible quality of Piyush.

#### Monitoring of Sales and Customer Satisfaction

EcoConcern does not have a formal system for tracking customer feedback, but staff collect feedback whenever possible. Regular feedback from distributors, retailers, and customers has helped improve Piyush over the years. Most direct customer interactions happen between customers and the staff of retail shops or distributors. Distributors share customers' feedback with ENPHO and EcoConcern. This feedback has helped improve the quality of the Piyush bottle, cap and seal, and packaging.

### Challenges and Lessons Learned: Monitoring for Improvement

- Feedback from retailers has shown that the price of Piyush and the profit margin for retailers is a sensitive matter. Low sales volume, risk of leakage, and short shelf life mean that retailers want a much higher profit margin if they agree to sell the product.
- Some of the feedback from customers is difficult for ENPHO or EcoConcern to address. For example, the smell of chlorine in treated water is a major complaint from some customers. EcoConcern has no control over the smell of chlorine products. However, other customers use the smell as an indicator of treated water and find it helpful.
- The quality of Piyush has been consistent, and there have been no complaints about the solution's concentration or quality. Staff measure the change in chlorine concentration over time by checking Piyush products in stock every quarter. Even products that have reached

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expiry dates still have a stable 0.5% chlorine solution, but they are removed from circulation for safety and quality assurance.

### Building Human Capacity

#### Building Capacity of Staff

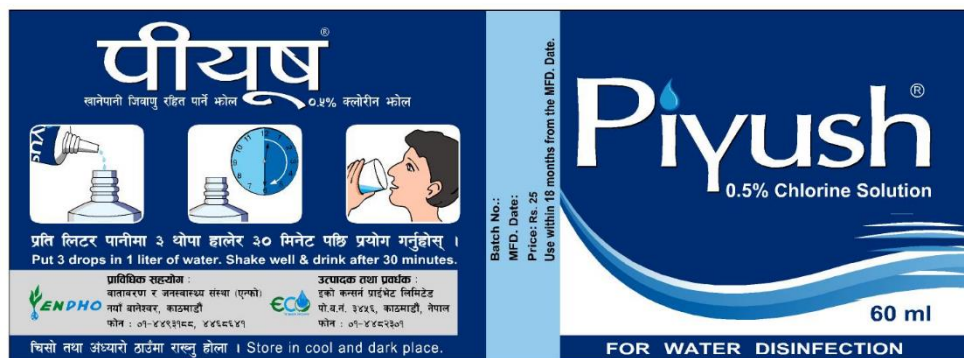
EcoConcern needs skilled and competent staff to ensure that Piyush products are of consistently high quality. Minor errors can result in a substandard product or packaging. EcoConcern has one very experienced staff member who oversees production and trains new temporary staff. All production staff work as a team, closely supervised by the senior staff member. Coaching and mentorship are encouraged within the team.

For the long-term success of Piyush, staff will need increased capacity in marketing and sales. EcoConcern is planning to hire a dedicated marketing expert to expand promotion and marketing of Piyush and other ENPHO products in a more effective manner.

#### Building Capacity of Users

ENPHO and EcoConcern run regular campaigns through radio jingles, leaflets, posters, and advertising banners. These campaigns increase awareness about Piyush, and educate users about when and how to use Piyush. Usually these events are part of larger WASH campaigns planned under different ENPHO projects. Project staff and the ENPHO Training Centre staff work together closely to design effective campaigns.

Sometimes, users forget how much Piyush to use or how long to wait after adding it. EcoConcern prints details for users on the Piyush label, such as: the value of using Piyush, instructions for use, and the expiry date of the solution.



Sticker label for Piyush with instructions for use (2017)

#### Challenges and Lessons Learned: Building Human Capacity

- Customers sometimes perceive Piyush as a solution that should be used only during disease outbreaks and emergencies. It has been challenging to educate them about the importance of Piyush, and HWTS more generally, for daily life.
- Having only one staff member dedicated to production of Piyush is an issue that EcoConcern is trying to address by on-the-job training of young people. However, the seasonality of Piyush sales make it difficult to maintain more staff for Piyush production alone. The production team is also engaged in producing Piyush+, Piyush++ and water quality testing kits.

### **Financing**

In the past, funding for Piyush was variable, relying on short-term WASH project grants. Initially, Piyush production and distribution was funded by a grant made to respond to the needs of Bhutanese refugees. From 1994 to 2000, ENPHO funded Piyush production and distribution from its internal budget. In the early 2000s, ENPHO began receiving grant funding for promotion and education activities. While this allowed ENPHO to do more Piyush promotion, it also made such work vulnerable to funding fluctuations.

In 2008 and 2009, ENPHO obtained funding from the Academy for Educational Development to promote Piyush and to build up ENPHO's social marketing capacity. This effort, together with government initiatives to promote HWTS, resulted in sales of Piyush reaching 300,000 bottles in 2009 and nearly 600,000 bottles in 2010. Funding, and sales, decreased substantially in 2012 and 2013. During the year of the megathrust earthquake (2015), sales reached 621,046 bottles.

EcoConcern has now taken over production and marketing responsibility, and is striving to make Piyush a profitable product throughout the country. EcoConcern is treating Piyush as a commodity that can be produced, sold, and scaled up through a sustainable business approach. As a social enterprise that stemmed from ENPHO, EcoConcern received initial funding from its shareholders, established professionals who have direct or indirect associations with ENPHO.

#### **Challenges and Lessons Learned: Financing**

- For many years, ENPHO did not earn a profit from Piyush, but it was reluctant to raise the price due to intense competition from other chlorine products. In 2005, two American organizations, the Centers for Disease Control (CDC) and Population Services International (PSI), introduced a rival chlorine solution, WaterGuard, to the Nepali markets. ENPHO, as a local NGO, lacked the capacity and resources to compete with CDC/PSI, so it responded by negotiating a short-lived strategic alliance with PSI to promote Piyush and WaterGuard in parallel. In 2007, PSI's funding decreased and WaterGuard's market share declined. During the period when WaterGuard was popular and widely promoted, ENPHO learned how much of an effect competition can have on the ability to sell and finance HWTS products. ENPHO hopes that by marketing and distributing through EcoConcern, a private business, they can better compete against subsidized products like WaterGuard.
- ENPHO and EcoConcern have realized that producing and selling Piyush on its own is not likely to be a financially viable business. EcoConcern markets Piyush along with many other WASH products and services. Costs for Piyush production and distribution are partially covered through funding from shareholders and from sales of EcoConcern's more profitable products and services.

## ENPHO and EcoConcern in Nepal: Summary of Lessons Learned

- ENPHO and EcoConcern are slowly learning and adapting as they move from providing Piyush as an NGO “social service” to selling it through a social business.
- Free distribution of Piyush can affect the long-term sustainability and viability of Piyush production and distribution. Because it has often been given to people for free during emergencies, Piyush is not always perceived as a consumer product for daily life.
- A wider network of distribution systems is required to increase the availability of Piyush across Nepal. Convincing grocery stores and pharmacies across Nepal to stock the product can be difficult when demand is low and taxes are high.
- Different Piyush products of varying concentration and volume (such as Piyush+ and Piyush++) have helped to cater to the needs of a broader range of customers.
- Competition from other products can have a large impact on the ability to market, sell, and make a profit on HWTS options.

### Further Information

The information in this case study is based on:

- Personal communication with Mr. Bipin Dangol, Executive Director of ENPHO (August 2016)
- Personal communication with Dr. Laxman Joshi, Managing Director of EcoConcern (February and April 2017)
- CAWST. (2010, September 1) Implementation Case Study: Piyush Chlorine, Nepal [pdf]. Retrieved from <https://www.hwts.info/case-study/ba598d19/Implementation-Case-Study-Piyush-Chlorine-Nepal>
- ENPHO. (2016). 25-Year Souvenir [brochure].

For more information about the organizations featured in this case study, refer to:

- ENPHO: [www.enpho.org](http://www.enpho.org)
- EcoConcern Pvt Ltd: [www.ecoconcern.com.np](http://www.ecoconcern.com.np)



Piyush (2010)



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CAWST (Centre for Affordable Water and Sanitation Technology)  
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Last Update: June 2017

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