

Coliform Presence/Absence Analysis in Ready-to-drink Water of Food Vendors of Kathmandu Valley

FACT SHEET *(Food Vendor Survey, ENPHO/UNICEF/2018)*



Background and Context

Street foods are ready-to-eat foods and beverages prepared and/or sold by vendors, especially in streets and other similar public places (FAO, 1986). The appetizing flavor, attractive color, and alluring appearance of foods sold at streets and alleyways are the favorites of every age group. Since these foods are quite cheap and easily available in the roadside and public places, it has become quite famous and preferred in the recent years. For many street food vendors, it has become simple yet significant way to generate income and support their livelihoods.

With the growing population in Kathmandu Valley, the trend of food vendors has been increasing significantly. The street food consists of varieties of fast foods like pani puri, chatpate, stick food, momo, soda drinks. The food vendors are surrounded by people, often in the evening time for savory taste. Similarly, tea shops of chowks and gallis (alleys) are visited by middle-aged to elderly people where they can chitchat with friends and fellows. Apart from the popularity, the quality of raw materials used, hygiene practice in preparation and handling of the foods and procedure used and most importantly, the quality of water used for preparing such food is often unnoticed. The water used in preparing food as well as cleaning dishes and raw vegetables/fruits can be the trigger for public health risk. Most of the street food vendors are found to be open and prone to dust and contamination. Above all, minimum priority is given to safety of the customer with respect to drinking water. The unsafe drinking water can cause various water borne diseases like diarrhea, cholera, dysentery and typhoid. Maintaining safe drinking water and assuring its importance among the many street vendors is thus an important aspect to be ensured.

In this context, ENPHO/UNICEF with coordination of seven different municipalities have undertaken study related to drinking water quality available at different street food vendors in the Kathmandu Valley. The project “Technical support to Municipalities of Valley in prioritizing Public Health Emergencies with respect to Cholera/AGE and other water borne disease prevention through Capacity Enhancement” aims to strengthen capacities in Cholera/AGE and water borne diseases prevention of two metropolitan cities and five municipalities of Kathmandu Valley. The study was conducted during monsoon season (June - August 2018). The study finding provides information on situation of quality and practices of drinking water among food vendors in those areas.

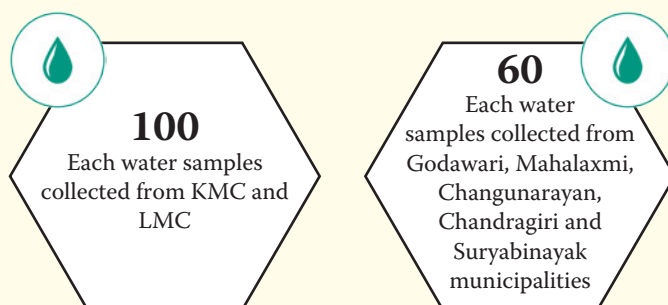
Study Area and Sample Size

The survey respondents are the local food vendors from the Kathmandu Valley.

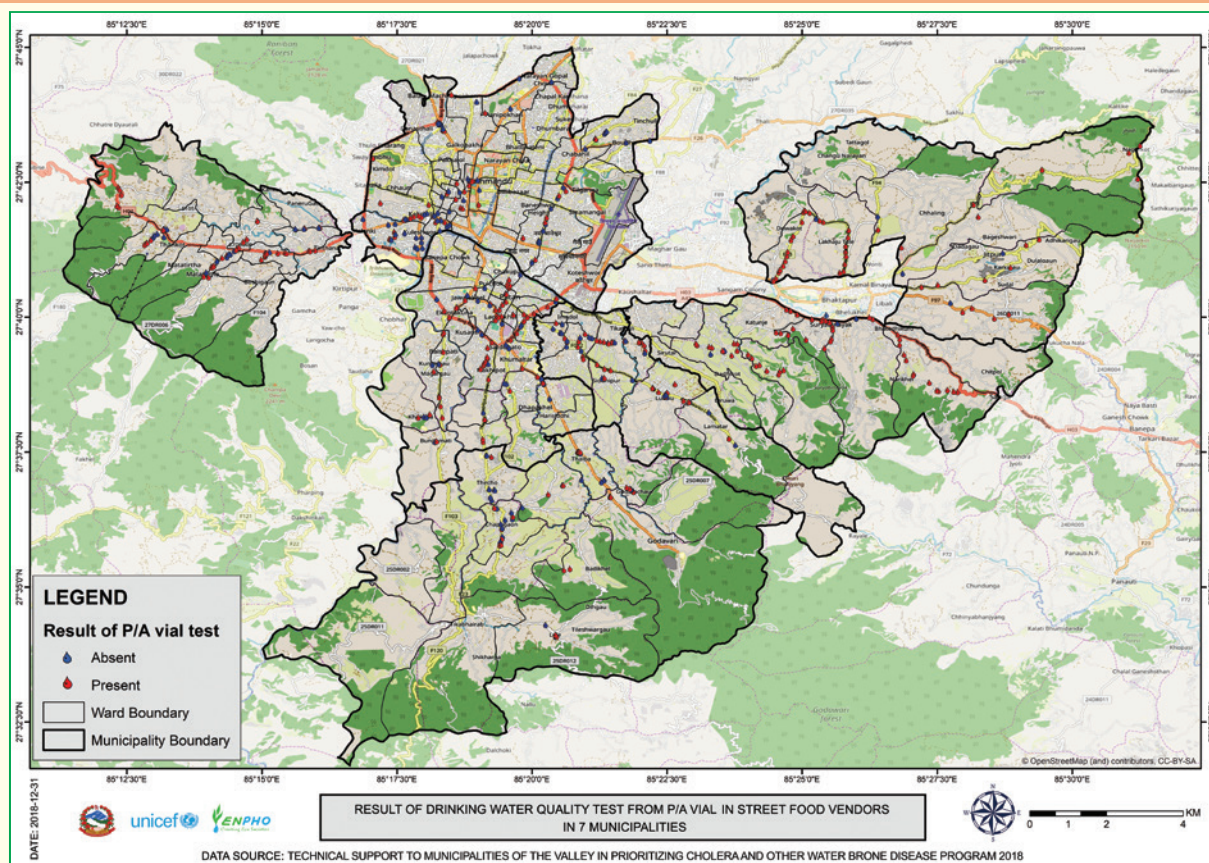
The water samples were collected from food vendors of seven different municipalities: Kathmandu Metropolitan City (KMC), Chandragiri Municipality, Lalitpur Metropolitan City (LMC), Godawari Municipality, Mahalaxmi Municipality, Changunarayan Municipality and Suryabinayak Municipality.

Altogether, 500 water samples were collected in which 100 samples were from two metropolitan cities and 60 samples each were collected from the five municipalities.

Total number of collected water samples and its location



Map showing Total Coliform Presence/Absence test results of ready-to-drink water served by food vendors in all seven municipalities



Methodology

The samples were collected from 'ready-to-drink' water from food vendor i.e. the water provided by the food vendors when consumer asked for drinking water. The samples were collected as per ease of access of the consumers, readiness to be a part of the sample and availability at a given time period. The survey was conducted using mobile application and thus the data was collected using Kobo Toolbox through volunteer mobilization. The sample water collected from the respondents was analyzed using ENPHO Coliform Presence/Absence (P/A) Vial Test Kit and the results were disseminated to the respective vendors through telecommunication.

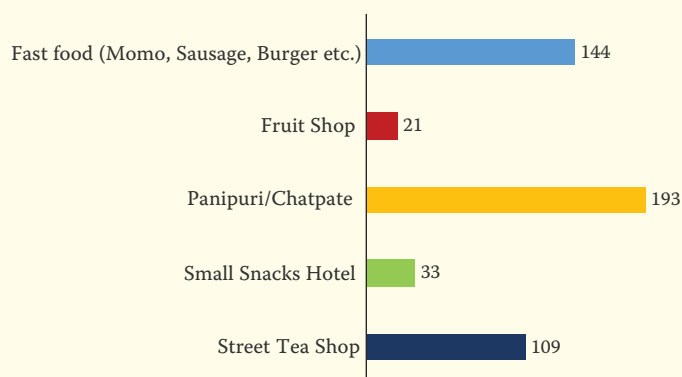


Findings

Types of food vendors

The 'ready-to-drink' samples were collected from the 500 food vendors, in which majority of the food vendors i.e. 193 were serving panipuri/chat, followed by fast food (144), tea (109), snacks (33) and fruit (21).

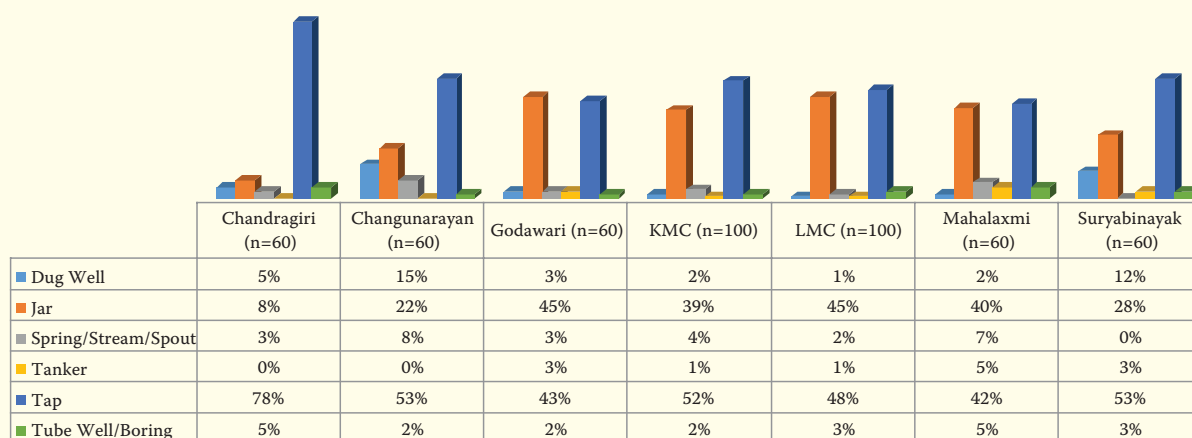
Types and numbers of food vendors



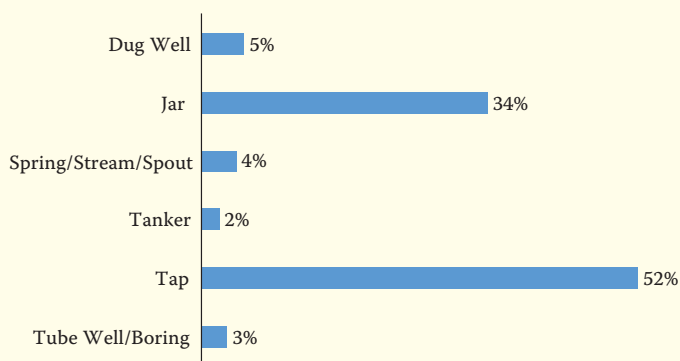
Sources of water

The majority of the sources serving the ready-to-drink water in food vendors were found to be tap water and jar water in seven different municipalities of the Kathmandu Valley.

Sources of water used by food vendors in seven different municipalities of Kathmandu Valley



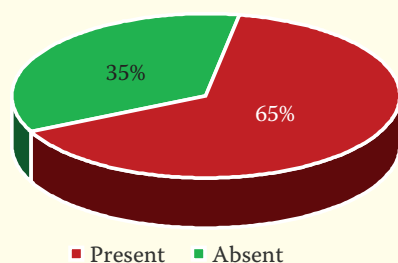
Major sources of water used by food vendors



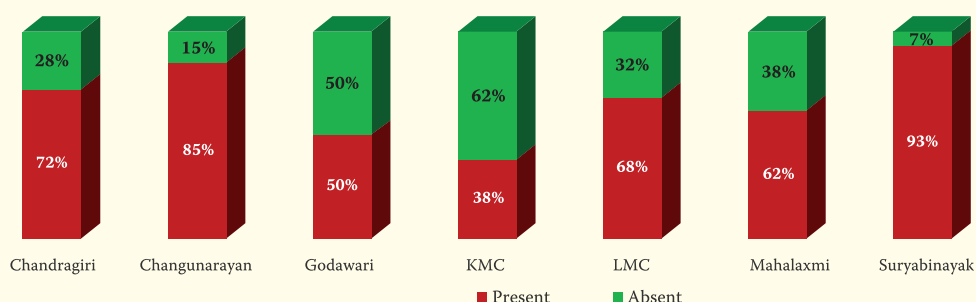
Presence/Absence of Coliform on ready-to-drink water

According to ready-to-drink water samples collected and analyzed through P/A vial test, majority i.e. 65 percent of the water sample collected from food vendors were found to be contaminated with coliform. Amongst all the seven municipalities, 93 percent of ready-to-drink water sample were found to be contaminated with coliform in Suryabinayak municipality. Similarly, the presence of coliform was found to be high at Changunarayan (85 percent) and Chandragiri (72 percent) municipalities as well. The minority of coliform contaminated was observed in KMC i.e. 38 percent.

Coliform P/A vial test results on ready-to-drink water

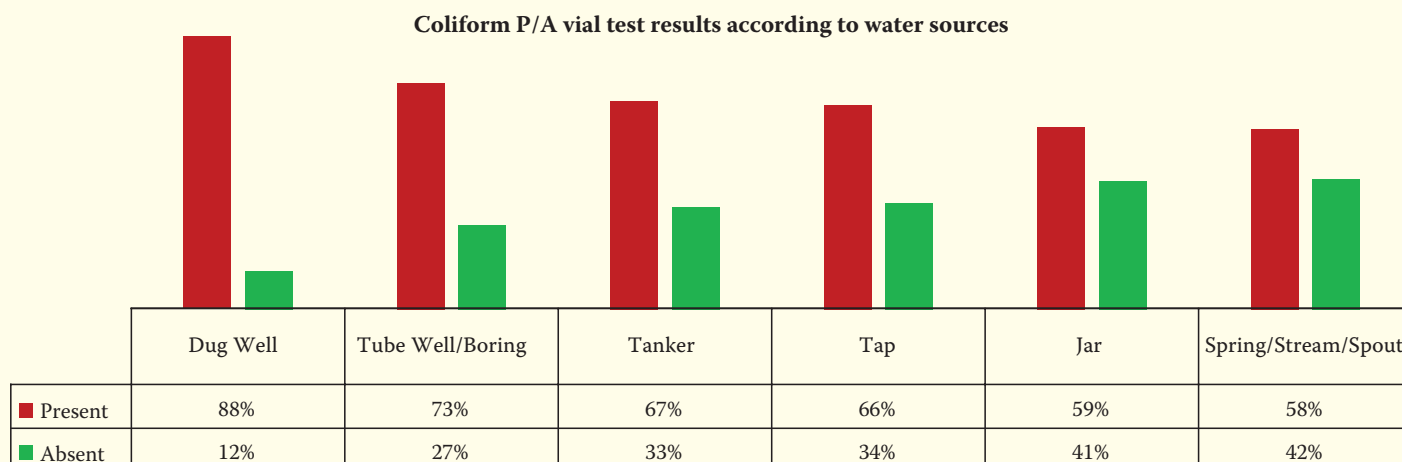


Coliform P/A vial test results according to seven different municipalities



Presence/Absence of Coliform according to sources of water

The figure below depicts the status of different sources and coliform presence/absence in each source. According to the sources of water, dug well is the most contaminated water source. This was followed by tube well/boring, tanker, tap water, jar water and spring/stream/stone spout water sources.

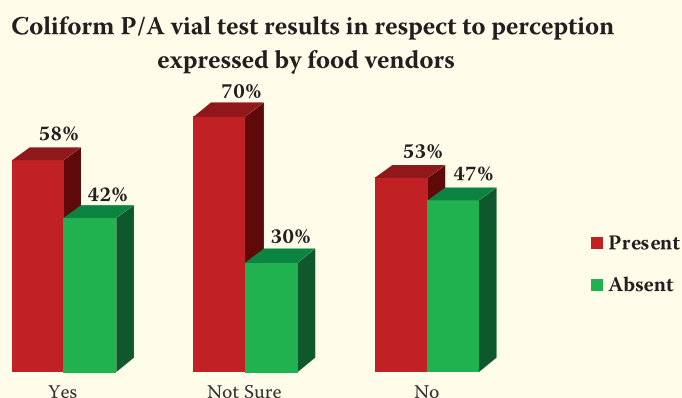
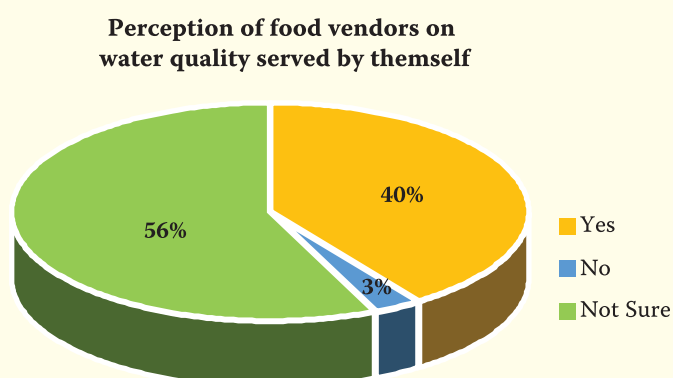
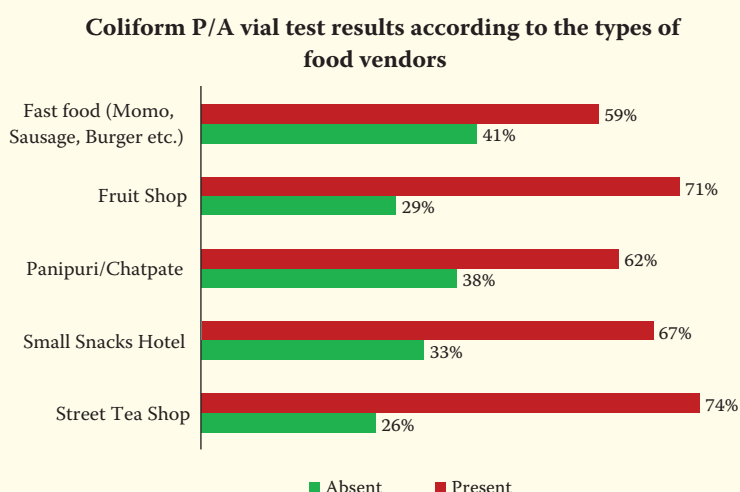


Type of water quality

Irrespective of type of 500 food vendors, nearly equal proportion of street vendors were found to be serving unsafe water quality for drinking. The majority of unsafe water was found in tea shop (74 percent) and least in fast food such as momos, sausages, burgers etc.

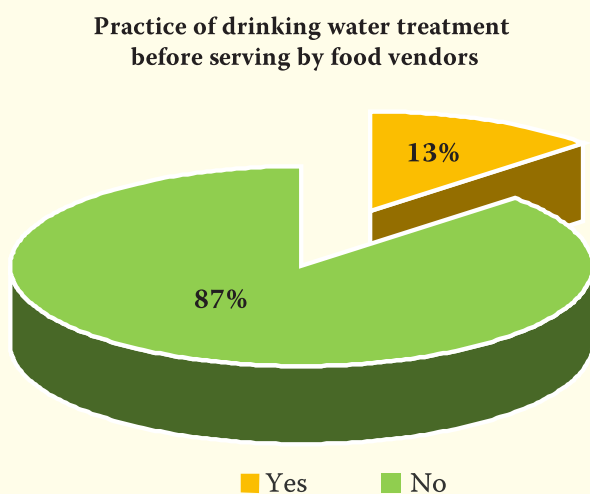
Perception of food vendors on quality of served water and its comparison with test results

Out of 500 respondents, 40 percent food vendors felt that the drinking water they have been serving was safe, 56 percent were not sure on water quality and 3 percent vendors even felt the water was not safe to drink. Perception of food vendors on water quality served in their shops and the actual quality of water as shown by P/A vial test has been illustrated in the figure below. The figure depicts that coliform is present in more than 50 percent of water samples and the quality of water couldn't match with quality as perceived by the food vendors.

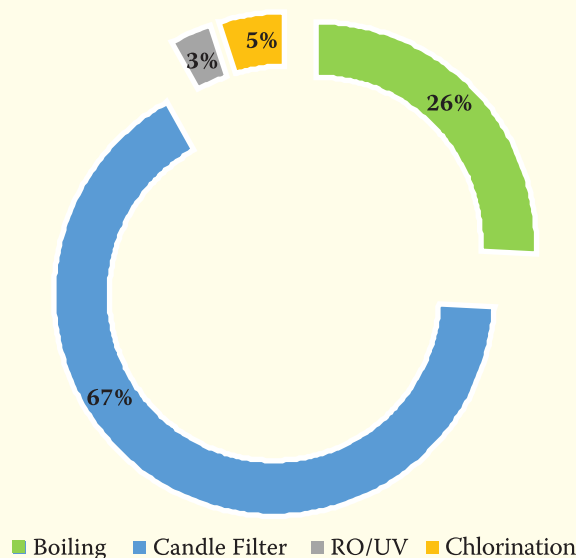


Use of drinking water treatment options (Point of Use - PoU option)

Out of 500 respondents, 13 percent of food vendors practiced the different drinking water purification methods, among which 67 percent use filtration method i.e. candle filter, followed by boiling (26 percent) chlorination (5 percent) and RO/UV filter method (3 percent).



Drinking water treatment options used by food vendors



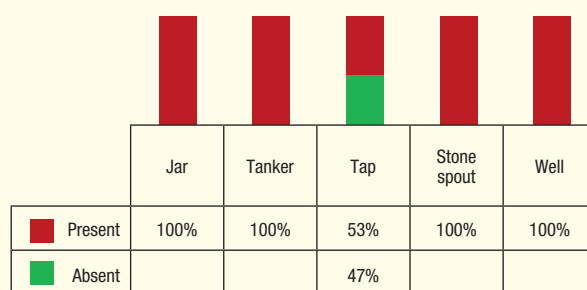
Discussion

The preliminary findings of the study revealed that 65 percent of the water sample shows the presence of coliform contamination while 35 percent of water sample shows absence of coliform, the test was conducted using ENPHO P/A vial test kit. This furthermore shows the ready-to-drink water served by the food vendors in Kathmandu Valley is unsafe for drinking purpose. Since the study was conducted during monsoon season, coliform contamination shown by P/A vial test also tip-offs risks of water borne diseases through water served by street food vendors. It is also found that water sources, hygiene behavior and practices and urban sanitation issues are the main causes of increment of water borne disease in the valley. Additionally, study reflects that hygiene behavior of food vendor and quality of water served irrespective of food types are the probable causes to support water borne disease prevalent in Kathmandu Valley. This study also identified that majority of the water sources used by food vendor were contaminated with coliform and only few are practicing water purification methods but in an improper way.

Conclusion

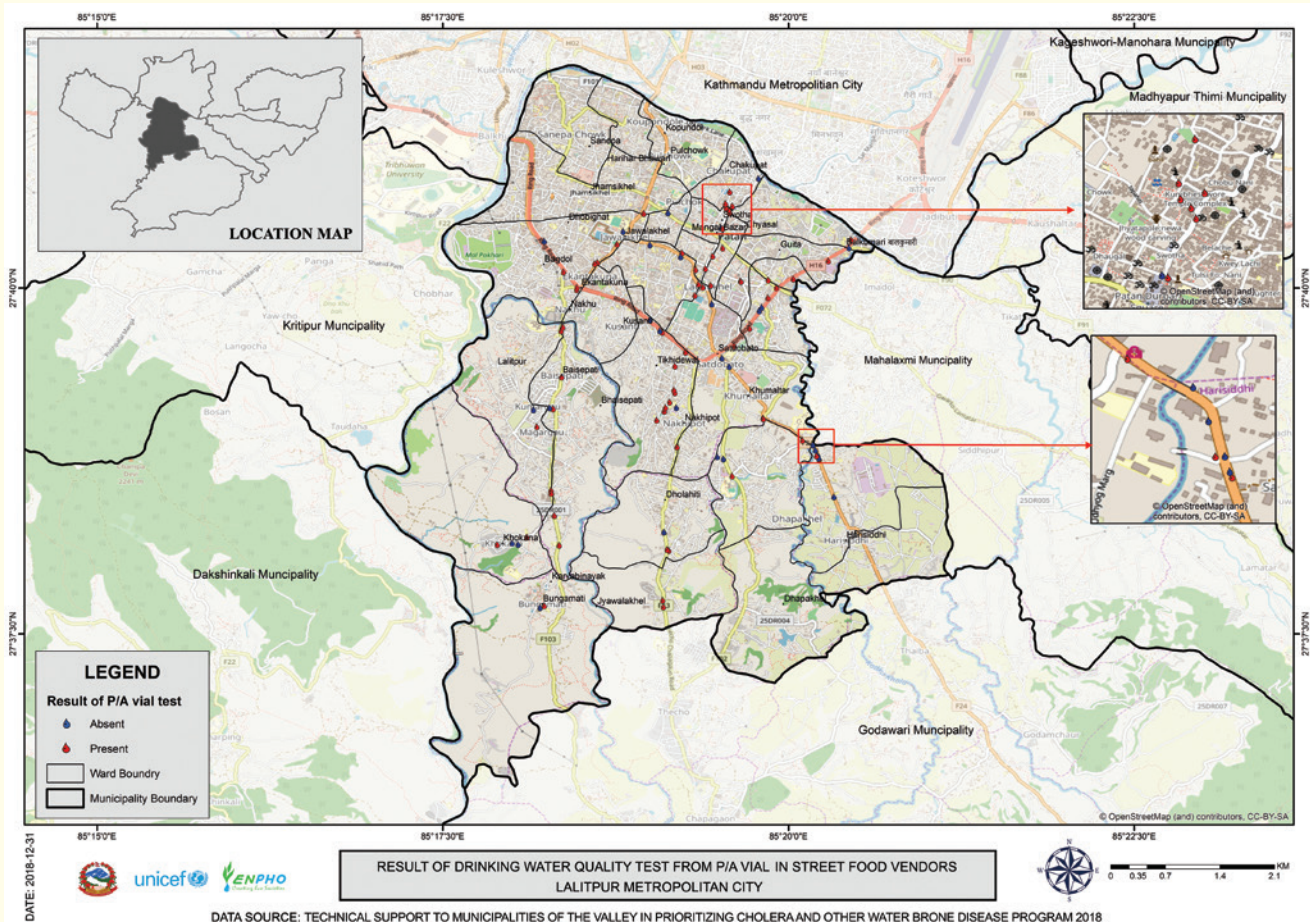
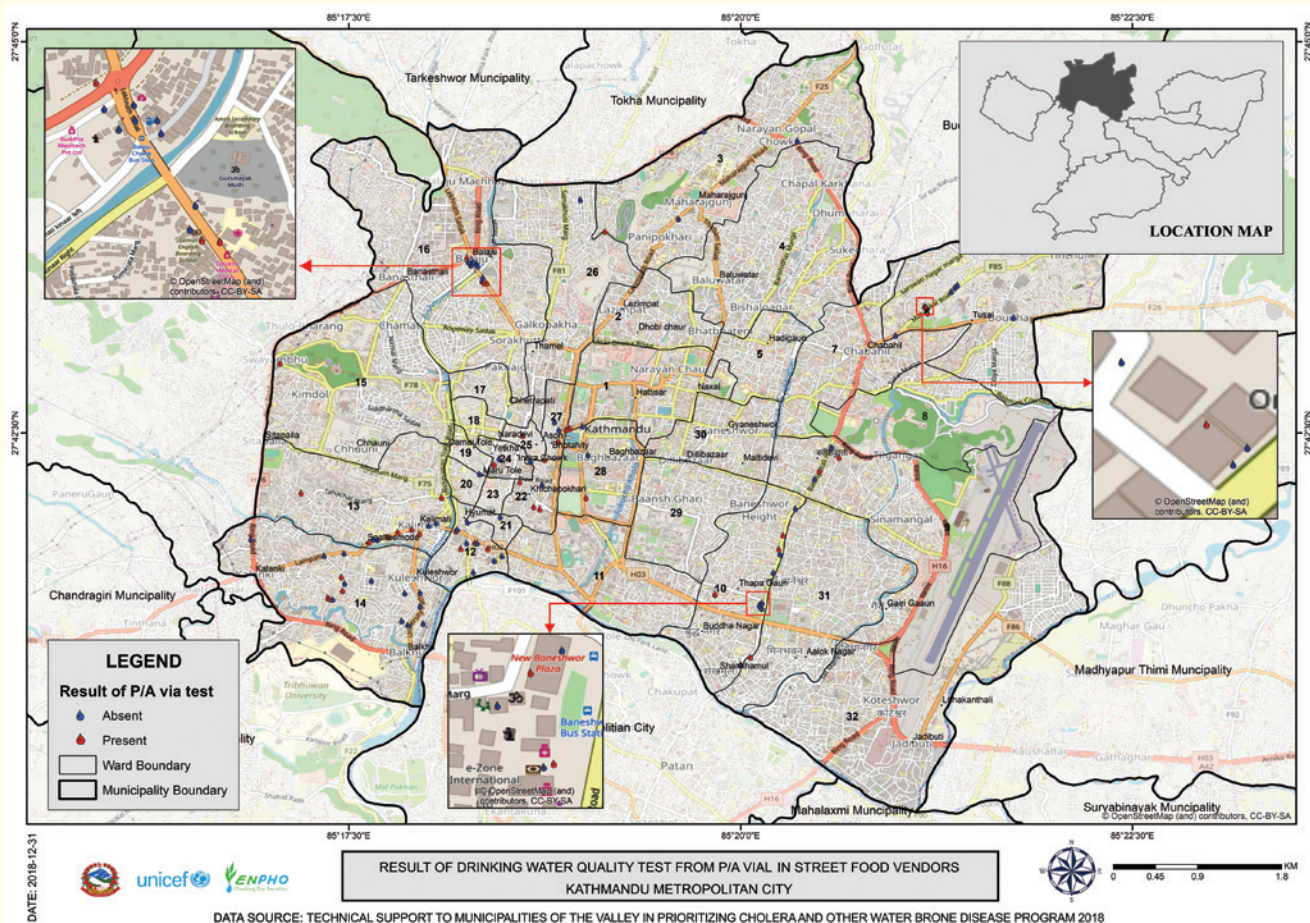
Source contamination and cross-contamination during water storage and handling are the main causes of water contamination which further increases the occurrence of water borne diseases. The findings of the study on 2017, revealed that majority of ready-to-drink water of food vendors in Kathmandu and Lalitpur districts were contaminated with coliform based on the tests using the P/A vial (please refer to Source: Coliform Presence/Absence Analysis in Ready-to-drink Water of Food Vendors of Kathmandu and Lalitpur Districts Fact Sheet (ENPHO/UNICEF Survey, 2017)). The preliminary findings of the study of this year's survey depicts the same results. Every year this issue has been increasing. For this, mass awareness and effective sensitization activities on importance of safe drinking water and practice of PoU options are to be implemented among the food vendors in order to reduce the associated mortality and morbidity rate linked to water borne diseases. But before this, food vendors need to be incorporated and should be liable under local government to safely conduct and regulate the street vending operations in those local areas for safe practices and behaviors regarding safe drinking water and better sanitation practices. Additionally, routine monitoring and supervision from concerned authorities is must to improve water quality and hygiene practices. And on top of that, sensitizing customers of food vendors on safe drinking water, sanitation and hygiene practices can be assertive to lower the risk of water borne diseases in the Kathmandu valley.

Coliform P/A in ready-to-drink water during monsoon [n=187]

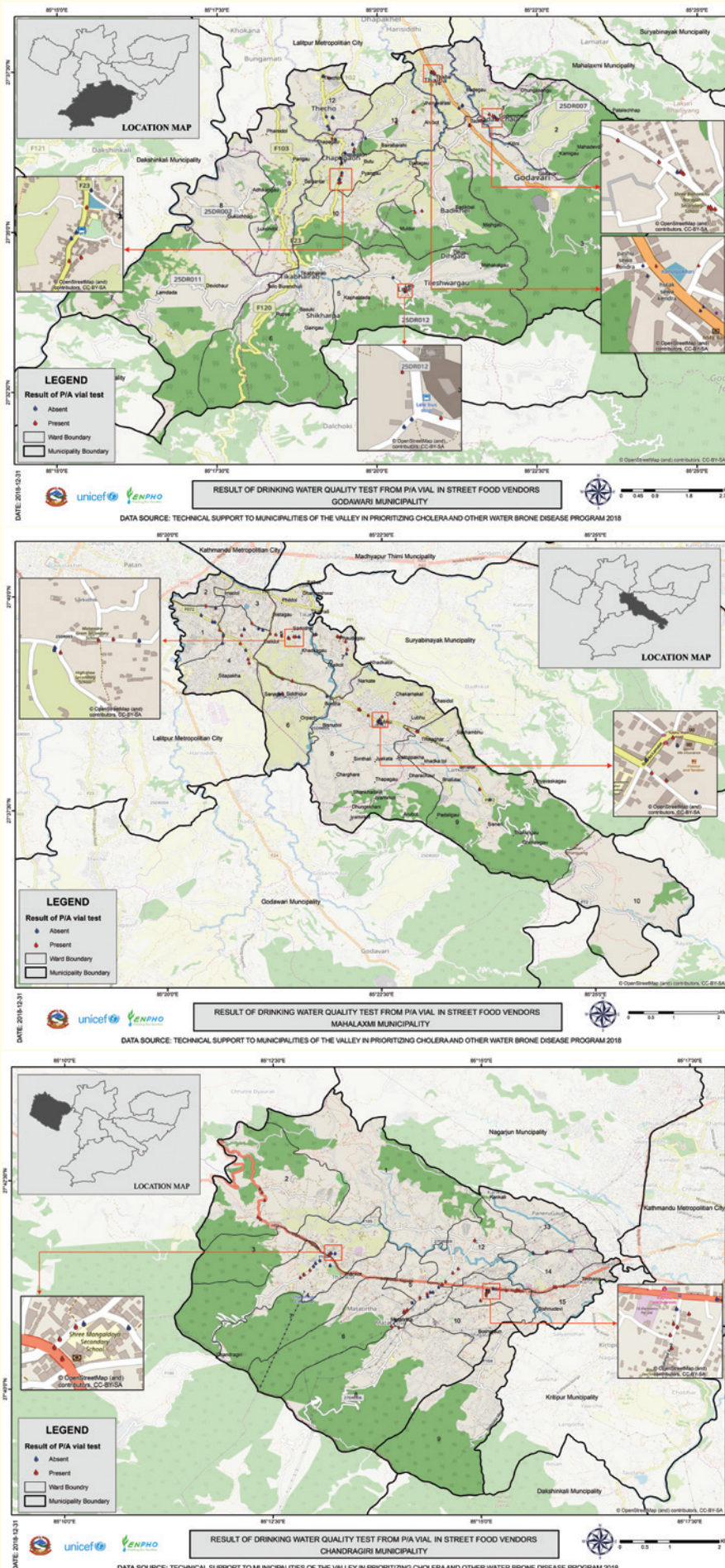


Source: Coliform Presence/Absence Analysis in Ready-to-drink Water of Food Vendors of Kathmandu and Lalitpur Districts Fact Sheet (ENPHO/UNICEF Survey, 2017)

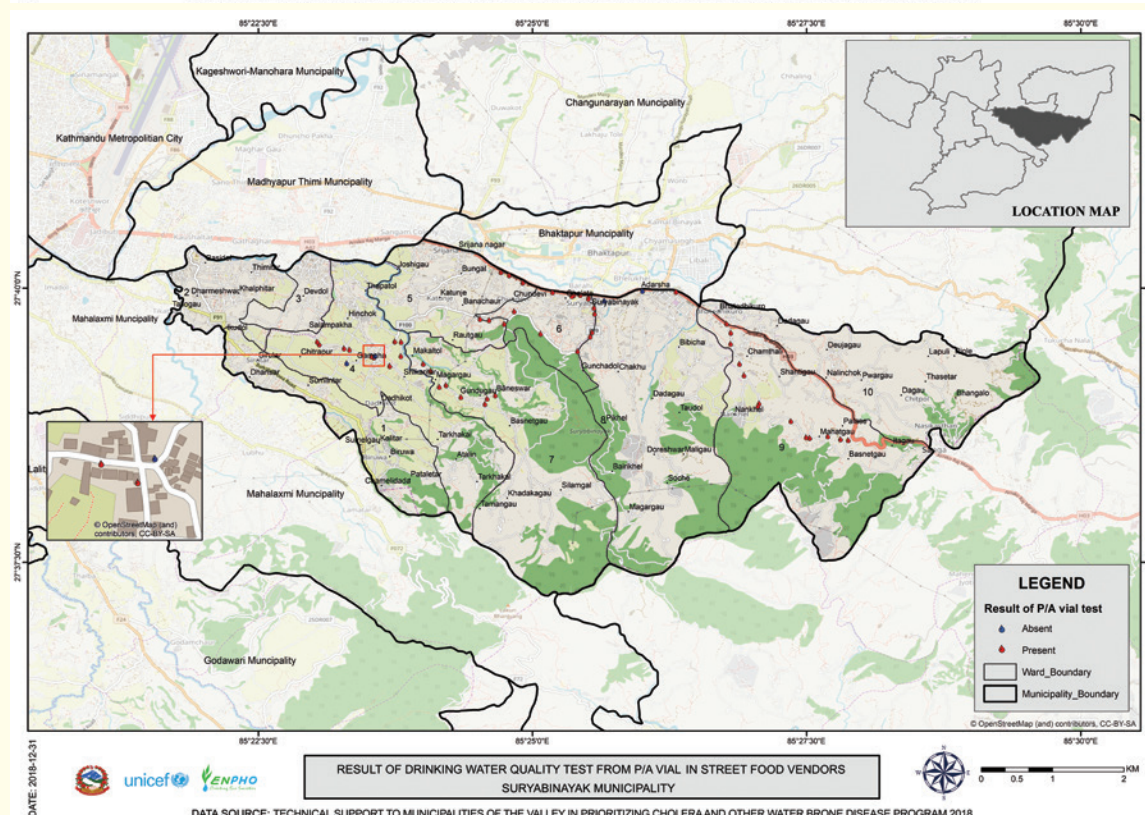
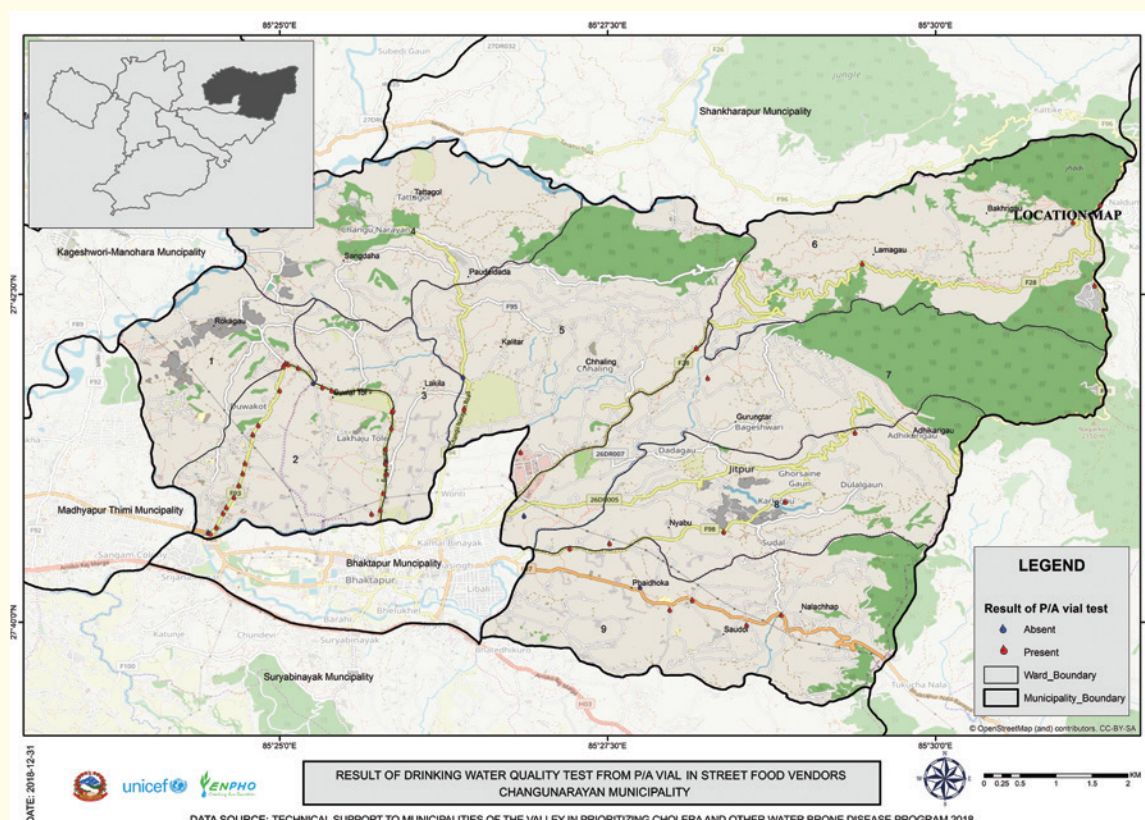
Map showing Total Coliform Presence/Absence vial test results of ready-to-drink water served by various food vendors from Kathmandu Metropolitan City and Lalitpur Metropolitan City



Map showing Total Coliform Presence/Absence vial test results of ready-to-drink water served by various food vendors from Godawari Municipality, Mahalaxmi Municipality and Chandragiri Municipality



Map showing Total Coliform Presence/Absence vial test results of ready-to-drink water served by various food vendors from Changunarayan Municipality and Suryabinayak Municipality



UN House Pulchowk
Lalitpur, Nepal • Tel: 977-1-5523200 • Fax: 977-1-5527280
Email: kathmandu@unicef.org • Web: www.unicef.org/nepal
Facebook: www.facebook.com/unicefnepal
Twitter: www.twitter.com/unicef_nepal
Instagram: www.instagram.com/unicefnepal



Environment and Public Health Organization
110/25-Aadarsha Marg, New Baneshwor
P.O. Box 4102, Kathmandu, Nepal
Tel: +977-1-5244641, 5244051, 5244609 • Fax: +977-1-5244376
Email: enpho@enpho.org • Web: www.enpho.org