Socio-Environmental Synthesis for Water Quality Study: Toxic Contaminants in Our Tap Water and Water Use Policy (2017-7)

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This case study is designed to invite students to apply socio-environmental synthesis to explore socio-environmental challenges of drinking water contamination and possible solutions. Lead and other toxic contaminants in drinking water become a major concern in the US. According to EPA, 41 states of US have reported higher than acceptable level of lead in drinking water. Many schools and daycare centers were alerted to test their water or install filters. In 2003-2004, over 65% of 6,118 residences tested for lead in Washington, DC exceeded the lead limit set as safe for drinking. Most recently, an elevated level of lead in tap water in Flint, Michigan affected hundreds of thousand people in 2016-2017. Thousands of people were threatened to lose their houses for over six-month water bill dispute for the contaminated water. Even if the exposure was over a longer period of time, the literature shows that the number of people affected by high lead in drinking water in the nation's capital, DC, was estimated to be 20 to 30 times larger than in Flint, Michigan. Biologically, there is no safe level of lead in drinking water, and lead is harmful to young children at all levels. Infant's, and fetus exposure to lower than the recommended level has been linked to damage to the central and peripheral nervous system, learning disabilities, shorter stature, impaired hearing, and impaired formation and function of blood cells. Research shows that one in four Americans drinks water that doesn't meet safe drinking water act standards, including other contaminants. Other toxic contaminants in drinking water include pharmaceutical and personal products. This three-part case is designed for a wide range of courses in the class of 3 to 4 hrs. In the first part (SLO#1 - 3), students will explore sources of drinking water contamination and its effect using associated socio-environmental synthesis. In the second part (SLO#4-5), students will explore water-food-energy-health nexus, and technological solutions for water use efficiency. In the third part (SLO#6-7), students explore the policy solutions, including challenges of water as a commodity or free access for human rights.

Resource File:

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waterresourcespassthejug.pdf [2]
water_pollution_from_agriculture_a_global_review_0.pdf [3]
lead_release_from_lead_service_line_during_the_water_crisis_in_flint_michigan.pdf [4]

Estimated time frame:

A few class periods (i.e., less than 3 hours)

SES learning goals:

- System thinking: ability to create a conceptual model for a socio-environmental system related to drinking water contamination and its impacts, and
- Project based: ability to analyze and synthesize existing data in order to create data driven conclusions in interdisciplinary teams.

Has this been tested in the class room:

Yes

Course and class size:

Urban Water Quality Management (25 students), Introduction to Environmental Science (15 students),

Does this case have an answer key:

No

Source URL:

https://www.sesync.org/socio-environmental-synthesis-for-water-quality-study-toxic-contaminants-in-our-tap-water-and-water

Links

[1] https://www.sesync.org/system/tdf/resources/case_study_revised_draft_september_13go_final_version.pdf?file=1&type=node&id=2825&force=
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