

Ainsley Jajack
Dublin Coffman High School
Dublin, OH, United States
The Solomon Islands, Water and Sanitation

The Solomon Islands: Widening Access to Water and Sanitation

The Solomon Islands are facing a crisis in sanitation. With nine hundred ninety-two islands, the country is known for its beautiful beaches and extremely biodiverse marine ecosystems. However, the Solomons are also home to countless poor, rural villages that often lack access to safe sanitation facilities. These villages are without easy connections to the rest of the Solomons and usually lack access to public services that improve quality of life. Opportunities to improve their circumstances are few and far between, and the lack of sanitation endangers the health and lives of much of this population.

The Solomon Islands are found in a parallel chain in the Southwest Pacific, with 6 major islands: Choiseul, Guadalcanal, Malaita, Makira, New Georgia, and Santa Isabel. The area of the country is 30,407 square kilometers (Solomon Islands Commonwealth), and the capital city is Honiara, Guadalcanal. The islands are often mountainous and heavily forested, and over 347 of the 992 islands are inhabited (OHCA).

The total population of the Solomons as of 2020 is 686, 878 people, with 75.33% of those living in rural areas and 24.67% living in urban areas (World Bank). Their major exports are wood, fish, coconut (copra and oil), betel nut, palm oil, and cacao (New Agriculturalist). The average farm size in the country is 1.9 hectares (4.7 acres) (Solomon Islands Government), much smaller than in the United States, which has an average farm size of 180 hectares (444 acres) (Statista). The Solomon Islands have a tropical climate with high temperatures, high humidity, and high rainfall year-round; however, the rainfall varies between the wet and dry seasons. Wet seasons stretch from February to May and September through November, while the dry seasons extend from December through mid-February and June through mid-September. The average temperatures in the region are 26-32° C (79-89°F) year-round (WeatherOnline), and the average rainfall amount is between 3 and 5 meters each year (Solomon Islands Government).

The head of state in the Solomon Islands is the British monarch, Queen Elizabeth II, represented by a governor-general, who is currently Sir David Vunagi. The head of government is the Prime Minister, Manasseh Sogavare (National Parliament of Solomon Islands). The Solomon Islands have a three-branch government with executive, legislative, and judicial branches. The governor-general is elected by the National Parliament and acts on the recommendations of the Prime Minister and his cabinet (Encyclopædia Britannica).

The average household size is 6.3 people in urban areas, and 5.2 people in rural areas (Statistics.gov). Most families live in small, single-family dwellings built from wood with thatched or ribbed metal roofs, and houses are often built on stilts (The Architecture of the Solomon Islands). A typical family diet consists mainly of fish, along with coconut, sweet potatoes, rice, taro roots/leaves, cassava, bananas, *ulu* (also known as breadfruit), beans, cabbage, and watercress (New Agriculturalist). The majority of the Solomons' food comes from subsistence crops they grow, but much of it is also imported from other

countries, with the biggest suppliers being China, Papua New Guinea, Indonesia, Australia, and New Zealand (WITS Data). The most common occupations are subsistence gardening, raising pigs, and fishing. The average salary is \$6,340 Solomon Islands Dollars (SBD) per month and \$76,080 SBD per year (Salary Explorer), which is equal to \$787.11 US per month and \$9445.33 US per year.

Education consists of six years of primary school and seven years of secondary school, but higher education is rare, consisting of 3 colleges that are all located in the capital city of Honiara. School is not compulsory, but primary school and secondary school are free and government-run, with the exception of some private schools. Less than 60% of children finish primary school, only around 30% of children enroll in secondary school, and the literacy rate is only 76% (Borgen Project). Secondary education is discouraged because most people live at the subsistence level, but vocational training is more common. Education is difficult to access for most, as the uneven population distribution makes providing schooling for all difficult.

Healthcare is not easily accessed in the Solomons. As of 2017, 126 out of 157 doctors in the Solomons (99%) were based in Honiara, even though it's home to only 13% of the population. There are only 12 hospitals and 340 clinics for all 992 islands, and 2 doctors for every 10,000 people. Many people have to spend their savings just to travel to a hospital, either by a long drive or even by boat to a different island, and the care itself is expensive (World Health Organization).

One of the major challenges that the Solomon Islands face is access to clean water and sanitation. As of 2019, only about 76% of urban households and 18% of rural households had basic sanitation access (defined by the CDC as "having access to facilities for the safe disposal of human waste, as well as having the ability to maintain hygienic conditions, through services such as garbage collection, industrial/hazardous waste management, and wastewater treatment and disposal"). Since much of the population still doesn't have access to proper sanitation facilities, this causes the spread of diseases and infections, as well as increases in physical and sexual violence. Women especially are more vulnerable to physical and sexual violence if they don't have private places for sanitation. When there isn't a close or convenient source of water, it's women and girls who are tasked with fetching it, which has negative health effects on their bodies, as well as meaning that girls are often made to carry water instead of going to school. In addition, the lack of sanitation facilities in schools means that girls often miss school during their period. Women are also often the ones who have to deal with wastewater in the home or assist children in going to the bathroom, increasing their exposure to diseases or infections that can be carried through the waste (Global Citizen).

Additionally, lack of access to sanitation increases children's risk of contracting childhood diseases, and exposure to human waste when open defecation is practiced can stunt growth, impair cognitive development, and increase child mortality (UNICEF). On the other hand, the elderly are weaker and more vulnerable to diseases, and lack of sanitation can worsen other age-related health issues (Sanitation and Water for All). 95% of the population of the Solomon Islands is composed of indigenous Melanesians, and there are minorities of Chinese, European, and Micronesians (1.2%) living there, as well as Polynesians (3.1%), and those populations mostly came from British colonization (Minority Rights Group). However, lack of sanitation and access to water is based mostly on location and doesn't discriminate by race or ethnicity.

However, these conditions are improving as more people gain access to clean water and sanitation facilities. Much of this is due to efforts from programs like the Rural Development Program (phase 1 provided access to water for provinces that were included in the plan, funded by World Bank, the European Commission, AusAID, and more) and the Solomon Islands Urban Water Supply and Sanitation Sector Project (expands water production and treatment facilities, and improves sewage and sanitation services across multiple islands, funded by World Bank and the Asian Development Bank) (World Bank). Still, there is a vast disparity between urban and rural populations. In 2007, 98% of urban people compared to 18% of rural people had access to sanitation facilities, while 97% of urban people had access to clean water compared to 65% of rural people (Borgen Project).

Lack of proper sanitation facilities can cause contaminated rivers, streams, lakes, and groundwater. When wastewater enters a body of water, the waste brings both excess nutrients and dangerous pathogens. The excess nutrients, such as phosphorus and nitrogen, can cause cultural eutrophication, which leads to algal blooms, and then, as the algae die, decomposers demand oxygen, which can cause anoxia (lack of oxygen in the water). This kills fish and other organisms that local communities rely on for food and income. The pathogens found in wastewater commonly include bacteria (that cause conditions such as cholera, typhoid, or diarrhoeal diseases), viruses (like Hepatitis A), protozoa, and parasitic worms. It can also mean more litter in the environment because there isn't anywhere contained to dispose of the trash, unlike when there are specific pit or flush toilets (Open.edu).

To help solve the issue of access to sanitation, a three-step plan could be implemented. Step one would be education about sanitation. This would provide communities with education about the dangers of open defecation and how/why proper sanitation facilities improve the quality and health of life. This can help them understand the benefits of improving sanitation facilities and influence them to want to change these issues in their community. If the people of a community are not only open to change but pushing for it, the process of implementing new sanitation facilities will go smoother and people will be more dedicated to using the facilities hygienically and maintaining them for long-term use.

Step two of the plan would be access to private sanitation. Given that most rural areas don't have access to running water in their homes, building enclosed pit toilets in rural villages would be the best approach to solving both unhealthy open defecation and the violence that results from it. Under one set of specifications from WaterAid, completed pit toilets have walls of at least 1.5 meters, a door, an unbroken and unobstructed toilet pan, and a working pan-pipe-pit connection, which would meet the needs of communities (BioMed Central). The number of toilets built in the village would depend on the population.

Step three would be to address the sustainability of the solution. Pit toilets eventually fill up with waste, and when they do, they must be emptied, or else the community may be forced to return to open defecation. A certain kind of pit toilet, a dry composting latrine, uses two chambers separated by cinder blocks, the first of which is filled, then left alone while the second chamber is in use for the next six to eight months. After this time, the contents of the first chamber can be used as a fertilizer for local crops (after being properly composted to kill pathogens and make it safe for application), and the process restarts, allowing the second chamber to dry while the first chamber is in use (Trees, Water, & People). If

dry composting latrines aren't used, emptying a normal pit toilet can be too expensive for these communities. A solution to full normal pit toilets would be using pumps to gradually empty sludge from the pits, then setting it up into a composting system to provide fertilizer. The cost of this service is less money a month spread over a long period of time, as opposed to having to pay a larger sum of money all at once when the toilets fill after a few years (NPR). This means that it's more manageable for poor families and has less of a sudden and dramatic effect on their financial situation.

The composting process for raw human waste from pit latrines is simple enough for remote villages to achieve without expensive new technology. It should be taken a safe distance from homes, then as it composts, microbic activity heats the compost to a temperature that will kill disease-causing bacteria. The temperature must be checked every few days, but within a year, the human waste will become a nutrient-rich fertilizer save for use on human-consumed crops.

In addition to a solution for accessing sanitation facilities, rural villages in the Solomons need increased access to clean water. Because the Islands consistently receive high amounts of rain and they have no issues with contaminated rainwater (acid rain), rainwater harvesting systems would help provide villages with clean water. Roofs would collect rainwater and funnel it into gutters and then into holding tanks for each family to use for drinking water, cooking, or hygienic purposes. However, these rainwater catchment tanks require layers of filtration to become potable, because even though rainwater itself is incredibly clean, once it comes into contact with a catchment surface, there is a risk of contamination. The first layer needed is a first flush diverter, which funnels away the first water flow from the roof away from the tank, to somewhere such as a garden. Next, there must be a screen in place to catch any large particles in the water before they enter the tank. After this, a slow sand filter could be used. This involves layers of sand and gravel that the water travels through, with a shallow water level maintained over the top sand layer. This allows for a bioactive layer to form, working with the sand to further reduce the disease-causing organisms possibly found in the water, leaving it safe for drinking. The cost of construction for each slow sand filter ranges from \$15 to \$60 US dollars. Another option would be to drill wells near villages, which could be used for some sanitation and domestic purposes, but due to the high saline quality of much of the well water, it isn't viable for drinking or cooking, and most agricultural water needs are taken care of by the naturally falling rain.

The World Bank could lead this project. It already has a program in operation for developing rural areas in the Solomon Islands, and this could be an addition to the plan. Ideally, each community being served would also assist in planning and executing the development of their own community, so that the specific needs of each village would be met to the fullest possible capacity. The World Bank receives funding from wealthy countries to carry out projects in developing countries, and these funds, along with donations from other organizations and charities that support sanitation improvements in developing countries, could fund the project. A similar organization is the Asian Development Bank (ADB), which has already invested over 500 million US dollars in the development and sustainability of the Solomon Islands.

Community members need to be willing and supportive of the change in the community, and if they are, they can help plan the amount and location of toilets, wells, or rainwater collection systems needed, as they would know best where they would be safest, most convenient, and most likely to be utilized. The

World Bank's or ADB's responsibilities (assuming one runs the project as mentioned) would include deciding which communities are most in need of service and the order that they will be assisted, in addition to managing and hiring people to carry out the project plan and acquiring the proper permits for construction. The Solomon Islands government would need to facilitate any necessary permits for building the toilets and drilling the wells. The government would also need to allow foreigners into the country to manage the project alongside locals, as well as provide permits or other legal requirements for the organization to travel around and between the different islands.

Local mindsets must be taken into account when implementing wide-scale change. Many rural communities resist change. They may believe that toilets are worse than open defecation; they may simply not want to go through the change. They may also feel as if the new sanitation methods are being forced on them. Education before the physical implementation of toilets often improves people's mindsets about modernizing sanitation facilities, making them feel more positively towards the change.

As the Solomons battle against the dangers of improper sanitation facilities and the lack of accessible clean water, they need assistance in accomplishing the necessary change. There are many realistic and attainable solutions to combat these issues, and with the help of foreign aid in cooperation with the local residents who best know their communities' needs, the Solomons can vastly improve the quality of life for many people. (2,637 words)

Bibliography

- Anonymous. "Access to Water and Sanitation for Older Persons – Celebrating the International Day of Older Persons." Sanitation and Water for All (SWA), 1 Oct. 2017, <https://www.sanitationandwaterforall.org/news/access-water-and-sanitation-older-persons-celebrating-international-day-older-persons>.
- Beaubien, Jason. "So What Do You Do with the ... Poo ... in a Pit Latrine?" NPR, NPR, 21 Mar. 2017, <https://www.npr.org/sections/goatsandsoda/2017/03/21/520979223/so-what-do-you-do-with-the-poo-in-a-pit-latrine>.
- Boisson, Sophie, et al. "Promoting Latrine Construction and Use in Rural Villages Practicing Open Defecation: Process Evaluation in Connection with a Randomised Controlled Trial in Orissa, India - BMC Research Notes." BioMed Central, BioMed Central, 1 Aug. 2014, <https://bmcresearchnotes.biomedcentral.com/articles/10.1186/1756-0500-7-486>.
- Koh, Wee Chian, et al. "World Bank Open Data." Data, 15 Dec. 2021, <https://data.worldbank.org/>.
- MacNeill, Ian. "The Architecture of Solomon Islands." The Architecture of Solomon Islands, 1 Jan. 1970, <http://ianmacneill.blogspot.com/2010/09/architecture-of-solomon-islands.html>.
- Nakaya, Rion. "Transforming Human Poop into Eco-Friendly Fertilizer." The Kid Should See This, 12 Oct. 2021, <https://thekidshouldseethis.com/post/transforming-human-poop-into-eco-friendly-fertilizer>.

- Project, Borgen. "Speaking about Water and Sanitation in the Solomon Islands." The Borgen Project, Borgen Project https://Borgenproject.org/Wp-Content/Uploads/The_Borgen_Project_Logo_small.Jpg, 9 June 2020, <https://borgenproject.org/water-and-sanitation-in-the-solomon-islands/>.
- Shahbandeh, M. "U.S. Farming: Average Farm Size 2020." Statista, 24 Feb. 2021, <https://www.statista.com/statistics/196106/average-size-of-farms-in-the-us-since-2000/>.
- Solomon Islands Population Characteristics. file:///media/fuse/drivefs-e5a8fd5e457d37cb9bd56ffab489184b/root/SOL-DHS_1-Pop.pdf.
- Thelwell, Kim. "8 Facts about Education in the Solomon Islands." The Borgen Project, Kim Thelwell https://Borgenproject.org/Wp-Content/Uploads/The_Borgen_Project_Logo_small.Jpg, 18 Dec. 2019, <https://borgenproject.org/8-facts-about-education-in-the-solomon-islands/>.
- User, Super. "Solomon Islands Climate in Brief." Solomon Islands Climate in Brief, <https://www.met.gov.sb/solomon-islands-climate-in-brief>.
- Weatheronline.co.uk. "Solomon Islands." WeatherOnline, <https://www.weatheronline.co.uk/reports/climate/Solomon-Islands.htm>.
- World Bank Group. "Safer, Cleaner Water and Sanitation for Solomon Islanders." World Bank, World Bank Group, 21 May 2019, <https://www.worldbank.org/en/news/press-release/2019/05/16/safer-cleaner-water-and-sanitation-for-solomon-islanders>.
- World Bank Group. "Solomon Islands: Empowering Communities to Access Clean Water." World Bank, World Bank Group, 15 Apr. 2015, <https://www.worldbank.org/en/news/feature/2015/04/14/solomon-islands-empowering-communities-to-access-clean-water>.
- "4 Ways Access to Water and Sanitation Affect Gender Equality." Global Citizen, <https://www.globalcitizen.org/en/content/4-reasons-water-and-sanitation-are-a-gender-issue/>.
- "Average Salary in Solomon Islands 2021." The Complete Guide, <http://www.salaryexplorer.com/salary-survey.php?loc=199&loctype=1>.
- "Dry Composting Pit Latrines." Sustainable Development, Sustainable Livelihoods, 15 Mar. 2016, <https://treeswaterpeople.wordpress.com/category/dry-composting-pit-latrines/>.
- "Health Closer to Home: Transforming Care in the Solomon Islands." World Health Organization, World Health Organization, <https://www.who.int/news-room/feature-stories/detail/health-closer-to-home-transforming-care-in-the-solomon-islands>.

- “National Parliament of Solomon Islands: To Lead Is to Serve.” National Parliament of Solomon Islands | To Lead Is To Serve, <https://parliament.gov.sb/>.
- “New Agriculturist.” New Agriculturist: Country Profile - Solomon Islands, <http://www.new-ag.info/en/country/profile.php?a=585>.
- “Report on National Agricultural Survey 2017.” Solomon Islands Government, Nov. 2019, https://spccfpstore1.blob.core.windows.net/digitallibrary-docs/files/6a/6a8dfa8ebf5c36b486a2e9e56d321663.pdf?sv=2015-12-11&sr=b&sig=6wXFACFC8BNjJ3TeMlrzwlGTAMrF6EKBlGAMQA9%2FRU%3D&se=2022-01-13T06%3A27%3A25Z&sp=r&rsc=public%2C%20max-age%3D864000%2C%20max-stale%3D86400&rsc=application%2Fpdf&rsc=inline%3B%20filename%3D%22Solomon_Islands_2017_National_Agriculture_Survey_Report.pdf%22.
- “Sanitation & Hygiene Home.” Centers for Disease Control and Prevention, Centers for Disease Control and Prevention, 22 June 2017, <https://www.cdc.gov/healthywater/global/sanitation/index.html>.
- “Slow Sand Filtration.” *Centers for Disease Control and Prevention*, Centers for Disease Control and Prevention, 10 Jan. 2022, <https://www.cdc.gov/healthywater/global/household-water-treatment/sand-filtration.html>.
- “Sanitation.” UNICEF, <https://www.unicef.org/wash/sanitation>.
- “Solomon Islands - Housing.” Encyclopedia of the Nations, <https://www.nationsencyclopedia.com/Asia-and-Oceania/Solomon-Islands-HOUSING.html>.
- “Solomon Islands - World Directory of Minorities & Indigenous Peoples.” Minority Rights Group, 17 Nov. 2020, <https://minorityrights.org/country/solomon-islands/>.
- “Solomon Islands Food Products Imports by Country.” Solomon Islands Food Products Imports by Country 2018 | WITS Data, https://wits.worldbank.org/CountryProfile/en/Country/SLB/Year/LTST/TradeFlow/Import/Partner/by-country/Product/16-24_FoodProd.
- “Solomon Islands.” Encyclopædia Britannica, Encyclopædia Britannica, Inc., <https://www.britannica.com/place/Solomon-Islands#ref53968>.
- “Solomon Islands.” OCHA, 1 Mar. 2019, <https://www.unocha.org/off4ice-pacific-islands/solomon-islands>.
- “Solomon Islands.” The Commonwealth, 26 Mar. 2021, <https://thecommonwealth.org/our-member-countries/solomon-islands>.

“Study Session 2 the Effects of Poor Sanitation and Waste Management.” Study Session 2 The Effects of Poor Sanitation and Waste Management: View as Single Page, <https://www.open.edu/openlearncreate/mod/oucontent/view.php?id=80399&printable=1>.