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Testing a small-scale domestic rainwater harvesting project in the subarctic

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This small pilot project tested domestic rainwater harvesting (DRWH) in Black Tickle, an Indigenous Canadian subarctic community with long-term water insecurity, including a general lack of piped water. DRWH is more commonly associated with Africa; this is the first time it has been tested in the subarctic where water provision is often compromised. The Southern Inuit community of Black Tickle on the coast of Labrador lacks the financial, social and technical capacity to provide residents with safe, reliable, and accessible drinking water. Yet in Canada, a country with a decentralized water policy and governance system, it is the local government's responsibility to do so. In Black Tickle, the only source of treated drinking water, a potable water dispensing unit (PWDU), is inconveniently located, inappropriately-scaled, and expensive to operate; it is also subject to frequent breakdowns, which the local government cannot always remedy due to financial challenges. This results in drinking water shortages, a reliance on untreated water consumption, and extreme water conservation with the result that drinking water consumption is less than one-third of the Canadian national average. In Black Tickle, water-insecurity contributes to adverse health, economic, social, and cultural effects, and requires urgent action. The study utilized quantitative (survey data, weekly reporting of water collection and use) and qualitative methods (focus group discussions). DRWH units were installed at seven extremely water-insecure households chosen by the local government. We collected general use (e.g. washing) water rather than potable water, hypothesizing that this would free efforts to collect potable water. Results were measured over a six-week period from July 4th to August 12th, 2016. Participants harvested 19.07gal of rainwater per week, or 8.9% of pre-project general purpose water consumption. General purpose water consumption increased by 17% and water retrieval efforts declined by 40.92%. Households saved $12.70CDN per week, which was seen as significant in a community characterized by low incomes. Participants also perceived improvements to psychological health. Water retrieval from the units was difficult and, because no potable water was collected, drinking water consumption did not increase; instead, residents chose to "take a break" from water collection. The study identified additional water insecurity impacts that have not yet been included in the literature, such as decreases in recreational activities and safety related to fear of wildlife during water retrieval. We concluded that, while it cannot meet drinking water needs, DRWH can be a partial remedy to water insecurity in the subarctic, particularly in concert with other water retrieval methods and if enhancements are used (e.g. inexpensive garden hoses). DRWH is appropriately-scaled and inexpensive; project participants identified several significant benefits, suggesting it can be a measure to improve water security in the subarctic.