

# Assessing The Effect of Water Shortage on Hygiene-Related Health Risks of Local Residents in Danao City

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**Abstract:** Water shortage poses a significant threat to public health. This study looks at the effects of water shortage to hygiene-related health risks to the local residents, more specifically, residents from Danao City, Philippines. The researchers conducted qualitative research, interviewing 20 residents from Guinsay and Guinacot, Danao City, assessing the possible health risks due to the lack of access to clean water, the challenges faced upon maintaining proper hygiene practices, and the mitigation strategies adopted by the local residents who experience limited water supply. Residents express their concerns about the potential health risk from this issue and its effects to their hygiene practices, and they also expressed how lack of access to clean water or possible contamination of water resources can lead to detrimental effects. Mitigating this issue can be done by resource management, water conservation, informing local authorities, and storing water for later use. Although sustainable solutions such as conservation and stockpiling are not viable in solving the problem in the long run, the government will need to intervene and ensure that the health and well-being of the community is prioritized. So this research highlights the very urgent need to ensure the importance of providing solutions to problems like these in order to mitigate the negative effects that it may bring forth.

**Keywords:** Shortage, hygiene practices, health risks, mitigation, challenges, water.

## 1. Introduction

Water is a huge contributor for human survival, affecting people's lives all over the world. Water is essential in supporting the body's basic functions, including homeostasis, detoxification, and digestion, it is also required for preventing the spread of unwanted pathogens. Sufficient water intake is required for adequate energy acquisition and better overall physical performance. But many locations struggle to obtain such precious resource consequently leaving devastating effects on affected communities in terms of their health and lifestyle. As communities grow and climate change intensifies, the access of clean and fresh water is becoming more and more difficult, making more and more people face the impacts of water shortage.

The connection between inadequate water and public health is complex. Many challenges ensure that enough water supply is mixed with environmental factors—such as climate

change, political, and social factors. According to Deltares (2025) of the Global Water Watch, "Societies and economies are under threat because of the unreliability of per capita water resources due to climate change, non-sustainable use and political instability." Solving the problem of water shortage needs a deep understanding of the issue and steps of sustainable solutions. This includes enhancing water-saving practices, investing in water storage and distribution infrastructure like water pumps, and advocating for policies that promote equal access to water for every community, fortunately several organizations have been brought together to fight such challenges, including the Pacific Institute established by Peter Gleick, World Water Council, and Charity: Water established by Scott Harrison. In addition, efforts in public health that include informing populations regarding waterborne diseases, personal hygiene practices, and sanitation can decrease the transmission of disease and overall health and well-being of people.

On a global scale, the struggle to access sufficient amounts of clean water has affected billions of people for their sanitation and proper hygiene. Global sustainability is unable to happen without ensuring the accessibility of safe drinking water for consumers. One of the major goal for United Nations 2030 agenda is "Ensure availability and sustainable management of water and sanitation for all", despite being a major goal for UN 2030 agenda for supportable global development (United Nations, 2015), due to the current growing of water shortage, an increasing number of residential, commercial, industrial, and agricultural water consumers worldwide have been negatively affected (Farazami et al., 2010; Vollmer et al., 2021) The demand of global water is anticipated to grow by 55%, meanwhile around 25% of large cities are currently facing water stress (Schlamovitz & Becker, 2021). Four billion people experiencing water shortage for at least one month annually due to the interrelated factors namely climate change, severe droughts, population growth, rising demand, and poor water management, these factors have further strained the shortage of freshwater resources (Shalamzari et al., 2018; Khatibi et al., 2019; Orimoloye et al., 2021). Additionally, around 2.2 billion people are unable to access safe drinking water which causes

disruptions to their basic daily activities such as bathing and drinking (United Nations Children's Fund & World Health Organization, 2019). As the majority of the water shortage kept their focus more on quantity, we must not let water quality be neglected for it is equally just as important as the quantity. During the times when water shortage becomes severe, the risk of compromised water quality has increased due to insufficient treatment, contamination, and infrastructure challenges. In regions that are facing water shortages are at high risk of experiencing the declining water quality (Vilet et al., 2021). Implementing effective water management and distribution strategies are crucial to ensure consistent access to sufficient, safe water as climate change intensifies droughts that would cause further problems (Salehi, 2022). Due to the increasing population and economic growth, the demand for water resources continues to expand globally, leading to regional and seasonal shortage of clean water in numerous countries (Qian et al., 2025). Clean water resources in the Middle East region are becoming insufficient, while millions of people thus far lack access to adequate and clean water for drinking and sanitary purposes. The decrease of water resources has become a crucial issue in this region that has a possibility to worsen (Bozorg-Haddad et al., 2020). By focusing on water conservation through water harvesting, protection and addressing the use of fresh water in agriculture has contributed to the change of landscapes, these efforts to mitigate the water crises requires the beginning of adopting good governance practices and transparency. Due to these initiatives, campaigns and awareness programs regarding water conservation have been implemented to secure consumer participation and bring about behavior change. (Patil, 2020; Qureshi, 2020).

Water shortage is one of the significant problems in the Philippines due to the rapid population growth and poor governance, leading to a limited water supply and a high-water demand. In the Philippines, 9 million out of 101 million Filipinos suffer from the harmful and unimproved water (Palanca-Tan, R. 2020). Nearly 5 million Filipinos use unsafe water and 9 million of Filipinos lack access to improved fresh water. In 2016, one of the top ten causes of people dying is because of acute watery diarrhoea. Six to eight months of the year are largely dry and during these times severe water shortages occur leading to people relying on unsafe water sources due to not having a proper supply of fresh water. They may also lack sufficient water for washing to maintain basic hygiene and having unsafe usage of water may lead to serious health consequences (Barkwith, A. 2021). In the Philippines, 331 out of 1,489 municipalities are considered waterless communities. This means that more than half of the people living in these areas don't have access to clean water, putting them at serious risk of waterborne diseases. The absence of proper treatment of wastewater that is polluted by feces and other harmful substances can cause serious malnutrition and infections when consumed. Alternative sources for water such as the rainwater contaminated with bacteria can also cause

significant health risks. Solving the problem of clean water and sanitation is for the United Nations' Sustainable Development Goal 6 central project that aims to ensure clean water in 2030 (Ignacio, et al. 2019). Since March 2019 a lot of households in Metro Manila has experienced periods where water is not available at all, as well as times when water is limited, escalated by the El Nino phenomenon, which has caused a 60% reduction in rainfall in half of the country's provinces compared to the long-term average, according to government reports. At the city East Zone, Manila water only provides 30% more water than usual to the seven million people living in that zone because of the lack of water (Blomerg, M. 2019). The El Nino phenomenon, population growth and urbanization, and climate change contribute significantly to water shortage. Climate changes increase global temperatures, leading to having prolonged droughts, unpredictable weather, and extreme weather patterns that disrupt water availability. The El Nino phenomenon escalated by reducing rainfall and increasing evaporation due to extreme heat. Meanwhile, rapid population growth and urbanization place an intense pressure on water resources, higher demand of water, and over-extraction of groundwater (Son, et al., 2019).

Water shortage can significantly impact the everyday lives of local communities. According to "A Study of Water Supply and Demand Dynamics in Danao City, Cebu, Philippines" (Castilla et al., 2024) the challenges of providing sustainable water supplies for a rapidly growing urban population have several factors that might be limiting Danao City's water supply's effectiveness. Danao City may be affected by an imbalance between the amount of water required and the resources that are available. The current water supply is under pressure due to many factors. With more people, excessive usage of water in homes and factories, and prominent demand for agriculture could affect the supply of water. Droughts could also take place by speeding up water evaporation, making it difficult to access water. As temperature rises, people and animals are in need of more water to sustain their health, in order to avoid a medical emergency known as heat stroke or hyperthermia. The supply of the water resources heavily relies on rainfall. However, recognizing the importance of water supply services often creates an imbalance between water use and harm in natural habitats. This happened in the water supply of Danao City, in which the water supply was scheduled. Several parts of the city had a water supply only in the morning, others had it in the evening. People in the community may experience disruptions in their everyday living conditions and hygiene habits, which could have a harmful impact on their health and well-being. In general, the community's inability to obtain fresh water hinders both the development of the community and the capacity of its members to maintain personal cleanliness and hygiene.

In conclusion, the water shortage crisis is a major problem, especially in places where people are already struggling with poverty and poor proper infrastructure. Access to clean water is

not only for daily basic needs but also essential for preventing disease and to maintain overall health. To fix this, the coordination of government and communities would have a big impact by improving water conservation and enhancing education on sanitation practices. While challenges remain, global cooperation can help mitigate the impacts of water shortage, ensuring a healthier and better future for every community.

## 2. Literature review

### A. *On the Hygiene-related Difficulties Encountered by the Local Residents*

On local communities' experiences and perceptions, water shortages often involve both limited access to water as well as lack of water supply for everyday needs and for hygiene practices. Individuals who live in areas with limited water supplies frequently struggle with the quantity and quality of the water they receive, as well as its reliability. These problems are made worse by the fact that some people often have to travel far to get water supply, sometimes from contaminated or animal-shared sources (Catherine et al., 2023). Hence, these situations often end up in conflicts among individuals and a variety of social and emotional problems such as feelings of helplessness, frustration, and shame. Still, many people continue to spend a lot of their time and attention on making sure that they have access to enough water for their basic needs, which can cause problems and could interrupt their daily activities. Individuals respond to these issues by putting various solutions into action, such as limiting water use and boiling water to ensure safety. Yet, concerns about water contamination and the sustainability of local water sources still arise despite these actions. This shows the urgent need for improved water management, better water facilities, and more sustainable practices to ensure that communities have a reliable and safe water supply (Seretlo-Rangata, Sodi, & Govender, 2025).

### B. *On the Perceptions of Residents Regarding Water Shortages in Health Risks*

Domestic water shortage is causing stress to many urban locations in advancing countries and a well-planned and sustainable coping strategies is compulsory in order to bequeath residents decent lives (Kusena et al., 2017) According to World Health Organization (WHO), waterborne diarrheal diseases are liable for over 2 million deaths every year globally, with mostly occurring to children under 5 years (WHO, 2018). In the country Pakistan, roughly about 60 million people are in peril of being affected by high concentrations of arsenic in drinking water; the substantial mass poisoning in history (Guglielmi, 2017). Arsenic poisoning can be the root of cancer, restrictive pulmonary disease, skin lesions, cardiovascular problems, diabetes mellitus, gangrene, neurological impairments, and problems in endocrine glands, immunity, liver, kidney, and bladder additionally to socio-economic hazards. (Rahman et al., 2018) (Nabi et al., 2019). Due to the uncertain and doubtful

supply of water in some regions, the majority of water consumers utilize in-house storage tanks to have additional resources for periods of low water pressure or interruption of water supplies, especially in summer (Negharchi et al., 2020) (Salehi, 2022).

### C. *On the Local Residents Strategies and Actions to Mitigate the Issue of Hygiene-related Health Risk During Water Shortage*

Water is one of the most essential resources required for human survival, influencing every aspect of our daily lives. Water plays a major role in maintaining good health and preventing illness. It supports the body's basic physiological functions, such as regulating temperature or homeostasis, flushing toxins, and aiding in digestion. Adequate water intake is essential for energy intake and overall physical performance. However, in many regions of the world, water shortage has grown prevalent, this can cause severe consequences for the health, economy, and overall well-being of communities and its inhabitants. Local communities that experience water shortages adapt to their predicaments by crafting various strategies in order to survive, according to Porio in the Asian Journal of Social Science in 2014. Climate change and flooding in Asian cities pose great challenges to the environmental and human security of the population and their governance systems. This paper examines the intersections of ecological-environmental and social vulnerability and the adaptive responses of urban poor communities and commercial-industrial establishments in Metro Manila to floods and other climate change-related effects, such as storm surges and sea-level rise (SLR). These weaken the communities' ecological-environmental systems, threaten the well-being and security of the people and strain the resources of city governments. Disaggregating the ecological-environment vulnerabilities of a city/community according to specific places/spaces (or place-based vulnerabilities) that lead also to variable patterns among different groups (e.g., gender, income group, sector) of adaptive responses to flooding. Drawing a systematic sample of urban poor households and industrial-commercial establishments along the Pasig-Marikina River Basin of Metro Manila, this study utilised household surveys, key informant interviews, focus group discussions (FGD) and secondary data sources, in analysing the sources of their vulnerability and adaptive responses. Existing studies generally focus on the vulnerability and adaptation of urban-rural populations and do not highlight the interaction of place-based vulnerabilities with sector-specific vulnerabilities that reconfigure flood impacts and responses among the urban poor communities and commercial-industrial establishments during and after floods. In particular, poor and female-headed households residing in highly degraded environments or places/spaces within and across urban poor communities suffered higher damages and losses compared to better-off households and establishments. The interaction of these drivers of vulnerability further heightens and compromises the environmental and human security needs of poor people, their

communities and those in the private sector that local/national government agencies need to respond to. Access to clean water is not only vital for daily survival but also essential for preventing disease and maintaining overall well-being. Addressing this issue requires a coordinated effort that includes improving water conservation, infrastructure, and education on sanitation practices. While challenges remain, continued global cooperation and innovation can help mitigate the impacts of water shortage and ensure healthier futures for vulnerable communities.

#### D. Research questions

This study aims to evaluate the possible effects of water shortages on basic daily activities such as hygiene-related health risks among local residents residing in Danao City. Particularly, this research seeks to examine and understand the challenges individuals encounter in maintaining proper hygiene in times of limited access to clean water, the recognized health impacts due to water shortages, how do the community members respond to the limited water access, and what are the strategies being implemented at the local household and community levels.

- What is the hygiene-related difficulties encountered by the local residents residing in Danao City in times of water shortages?
- How do local residents view the effects of water shortages in health risks specifically in relation to skin infections, waterborne diseases, and overall health and the well-being of the residents?
- How do local residents mitigate the issue of hygiene-related health risks during water shortages, and what strategies or actions have they developed as a result?

### 3. Methodology

#### A. Research Design

This qualitative research utilized a phenomenological design to comprehensively explore the lived experiences of residents who have faced and are currently facing water shortages and how it affects their daily life. This phenomenological study explores and describes the “lived” experiences of local residents who have experienced the effects brought by water shortage. The researchers utilized purposive sampling method as means of intentionally choosing participants that holds the knowledge, experience or characteristics that is suitable and relevant to the research objectives, allowing the researchers to concentrate on participants who are most likely to provide relevant data.

#### B. Sample / Participants

This study involved a total of 20 participants—9 from Guinsay, Danao City, and 11 from Guinacot, Danao City. Specifically, the 9 participants were selected from the zone of Cogon in Guinsay, which is situated near the highway. The other 11 participants were from the hillside area of Guinacot. Their firsthand knowledge and insights were considered

valuable in helping achieve the goals of the study. By involving the participants that have fundamental background in the subject matter, the study aims to get a comprehensive understanding of the issue, guaranteeing the study were well-informed.

The respondents of this study were chosen based on the following criteria:

- They must be a permanent resident of Guinsay and Guinacot, Danao City.
- Must have firsthand experience with water shortages in their household or community
- Regardless of gender and age, residents who experienced water shortages are eligible.
- They must be willing to participate and provide insights regarding the effects of water shortage on hygiene and health.

Residents were considered qualified to take part in the study if they met these criteria.

The study was conducted in Guinsay and Guinaot, Danao City, an area significantly affected and experiencing water shortages. This location was selected to see how the lack of water affects hygiene practices and health risks among the residents.

#### C. Instrument(s)

The research instrument used in this study is a semi-structured interview which is used as a tool in gathering data. This method was chosen because it allows respondents to share their thoughts and experiences freely while still following a basic set of questions. It also helps them and us understand how water shortages affect hygiene and among the people living in Danao City. The researchers prepared 3 open-ended questions to make participants talk about their experiences with water shortages, hygiene practices, and health concerns. These questions don't require any fixed answers, so respondents can explain their thoughts in their own words. The researchers will also ask follow-up questions to get into details about their responses and to help the respondents to elaborate their answers, to make sure that we fully get the gist of what the participants are expressing.

#### D. Data collection procedures

The researchers made a consent letter to inform the institution about the interview. Subsequently, after receiving the consent letter about the interview. Each participant answered questionnaires and follow-up questions prepared by the researchers. The selected 20 participants went through an interview using the semi-structured guide. The planned time interval for each participant was approximately 20-25 minutes, they are required to answer the questionnaires and follow-up questions unless provided a reason not to. The researchers requested the respondents to answer the questions with all honesty. In conducting the interviews, the researchers will be writing down notes of the answers of the respondents. The researchers also used devices such as audio recorders, video

recorders and cameras in order to accurately document the answers of the respondents as well as to avoid misinterpretation by just taking notes.

After the respondents answered the questions, the researchers gathered the data via audio recording. To protect personal information, all research data transcripts were anonymized and stored securely in both physical and electronic archives. The collected data should not be spread and should not be seen by anyone other than the researchers. The researchers use secure files or documents for this to ensure the privacy of the respondents. In addition, the researchers completely implemented the consent form's objective.

#### E. Data analysis

Thematic analysis, content analysis and phenomenological analysis are used for the data analysis procedure, and all fall within the data analysis process created by Creswell and Poth (2018), more specifically, Creswell and Poth's Data Analysis Process. This was used to analyze the qualitative data to identify recurring patterns or themes related to the water shortages in hygiene-related health risk and sorting out the gathered data in order to organize it into various themes. This method consisted of five phases: (1) managing and organizing data; (2) reading and memoing emergent ideas; (3) describing and classifying codes into themes; (4) developing and accessing interpretation; and (5) representing and visualizing the data.

### 4. Results and Discussion

#### A. What is the hygiene-related difficulties encountered by the local residents residing in Danao City in times of water shortage

- 1) Limited Water Access and Availability
- 2) Water Access and Availability

Water shortage is a serious problem that directly impacts an individual's hygiene. In order to practice good hygiene, clean water is required, yet many individuals do not have access to clean water due to limited resources. Without steady water supply, the individuals have a hard time in maintaining their personal hygiene, in turn affecting their health. Several respondents share that they struggle to secure enough water for daily use, forcing them to rely on stored water and unclean water sources. The following responses highlight how limited water access and availability affects the individual's hygiene practices.

"There is no water stock available at all times. Unless there are available water tanks, we can get limited water from it. If not available, then we have no choice."

This statement shows the inconsistency and uncertainty of water access, which significantly affects hygiene-related activities. "(Respondent 1)

"Save water in case emergency" (Respondent 8)

"It really is a big problem because we can't do our chores but we will store water." (Respondent 9)

It addressed the struggle of accessing water whenever there

is no water stock available, the inconsistency and uncertainty of water access and the storing of water to use and the limited water from available water tanks. They also mentioned that they started to store more water in tanks to use during the water shortage period, which can still affect their health negatively.

"Yes, especially when there is no stock, just relying that the water will always turn on. Depends if there are available tanks, if none, then we'll wait when it will turn on again." (Respondent 1)

Well, we have to save water in a case of emergency we need so we need to save water everyday (Respondent 8)

It really stops the process, for example if you want to wash the dishes after the customers have eaten, we can't wash it because of the water shortage. but we have containers, water stocking really helps. (Respondent 9)

"Our water usually shuts down at night or morning. Sometimes the water will get through but the flow is slow. The students will really get affected by it. When doing laundry or cooking, we will get the water through "poso" because there's no water here. When there's no running water, us residents here will gather at the "poso" to get water. So there's a tank here and then it has a scheduled time to turn it on or off. They will turn it off at 9 PM and turn it on at 4 in the morning and due to many residents here that use water, some people may not get access to the water especially those who live above, it will be hard to get there. It affects my daily chores such as washing the dishes, when we use the restroom, for cleaning. Every morning, my student [talking about her daughter/son] will have a hard time taking a bath due to poor water supply." (Respondent 18)

The response highlighted the challenges faced due to the inconsistent water supply in their area. The respondents said they save water just in case of an emergency; they need to save water every day. The respondents also have addressed that they cope up with this problem by saving and storing of water or using the available water tanks. Also, the usage of "poso" which gets groundwater is a manual water pump mainly when there is no water supply.

The participants' response highlights a significant impact of the limited water access and accessibility. Many residents struggle with the inconsistency of water supply. The lack of water accessibilities in the area disrupts the household tasks and their overall hygiene. Overall, in some cases, groundwater is used only for other domestic purposes than drinking, because the water quality is sub-standard and adequate point of use-treatment methods are not employed by end-users (Jenny Grönwall and Kerstin Dannert,2020).

#### 3) Compromised Personal Hygiene

Water shortage is one of the significant issues that will affect individuals' personal hygiene. Water is essential for maintaining proper hygiene, yet many people struggle because of lack of water supply. Without steady water supply it is difficult for the individual to maintain proper personal hygiene, leading to discomfort and health risks. This response highlights how water shortage affects the individual's proper hygiene

practices.

"Yes, like how we have trouble finding water for taking baths and washing our laundry." (Respondent 5)

"Yes, in health, in tight schedules, in work." (Respondent 7)

"It affects our hygiene practices." (Respondent 10)

"Yes it affects, especially to the students." (Respondent 11)

"Of course, there are days that I can't take a bath because there is no water." (Respondent 12)

"So our water source is at the top there, when it has a problem it will stop giving us water, brownout for example, or it will have a damage. Sometimes the water is mixed with dirt and mud. So it's a huge problem when dealing with our chores and hygiene because such as taking a bath and washing our clothes, we will go far just to get water. It's really hard. We will use motorcycles or just walk, just find ways to get water. When there's a shortage of water, it doesn't give me motivation to do the chores. Mainly, our hygiene is the one that will get affected." (Respondent 14)

It addressed the difficulty of accessing water such as when there's a brownout, also they have to walk long distances just to obtain it for their daily chores. They also mentioned that, at times, their water is contaminated with mud and dirt, which can negatively affect their health.

"Yes, because if there is no water then we can't do laundry and shower." (Respondent 16)

"Our water usually shuts down at night or morning. Sometimes the water will get through but the flow is slow. The students will really get affected by it. When doing laundry or cooking, we will get the water through "poso" because there's no water here. When there's no running water, us residents here will gather at the "poso" to get water. So there's a tank here and then it has a scheduled time to turn it on or off. They will turn it off at 9 PM and turn it on at 4 in the morning and due to many residents here that use water, some people may not get access to the water especially those who live above, it will be hard to get there. It affects my daily chores such as washing the dishes, when we use the restroom, for cleaning. Every morning, my student [talking about her daughter/son] will have a hard time taking a bath due to poor water supply." (Respondent 18)

The response highlighted the challenges faced due to inconsistent water in their area. They addressed that at night or morning the water is unavailable and when it has supplied the pressure is weak, this result significantly impacts a student, as well as the household chores. To cope with the water shortage, they have to use "poso", mainly a manual water pump, to fetch water when there is no supply.

"Yes, it affects our hygiene practices." (Respondent 19,20)

The responses from the participants highlight the significant impact of water shortages on their daily lives. Some travel long distances to fetch water in a manual water pump to meet their basic needs. Many residents struggle with inconsistent water. The lack of accessible water disrupts the essential household tasks such as laundry, cleaning, cooking, and bathing. The residents face difficulties maintaining proper personal hygiene which can affect their well-being and daily

routines. Additionally, water contamination with dirt raises health concerns. Overall, water shortage not only creates inconvenience but also increases health concerns, poses challenges to hygiene, productivity (Bazaanah, et al. 2023).

#### 4) *Disruptions in Household Chores*

Water shortages in Guinsay and Guinacot, Danao City, cause major disruptions to daily household tasks, significantly affecting residents' ability to wash clothes and dishes, bathe, clean their homes, and prepare food. These challenges create significant difficulties in their daily lives, with many residents reporting them as a serious concern.

"Water shortage gives us more problems. Especially when washing ourselves, cleaning the house, or even cooking." (Respondent 2)

This statement shows the water shortages significantly impact daily life, affecting hygiene, household chores, and cooking.

"It really is a big problem because we can't do our chores but we will store water." (Respondent 9)

This statement highlights how water shortages create significant challenges in daily life; however, residents attempt to mitigate the issue by storing and conserving water.

"Huge problems when dealing with our chores and hygiene practices such as taking a bath and washing our clothes." (Respondent 14)

The respondent experiences the same water supply issues as others, emphasizing its negative impact on their daily routines. The shortage makes it difficult to complete essential household chores such as cleaning, cooking, and washing. As a result, their daily tasks are frequently disrupted, causing inconvenience and added challenges.

The responses from the participants highlight their challenges of how water shortage takes a huge place in their daily chores, disrupting their household tasks such as cleaning, washing dishes, and cooking (Bose, et al. 2023). Addressing this issue is crucial in improving the living conditions of affected communities.

*B. How do local residents view the effects of water shortages in health risks specifically in relation to skin infections, waterborne diseases, and overall health and the well-being of the residents?*

##### 1) *On A. hygiene related issue*

Hygiene and health go hand in hand since many unwanted foreign microbes live off of unclean sources or places. This in turn then means that if you are unhygienic therefore there is a more likely chance for you to catch an unwanted illness.

"Yes, it has an effect on my hygiene practices since due to water shortage we are not able to take baths." (Respondent 1)

"It has a big effect especially on students who need to wake up early with their uniforms cleaned before going to school" (Respondent 6)

This response emphasizes how water shortage directly affects basic hygiene practices, which makes it difficult for

residents to maintain cleanliness, which can contribute to poor health conditions.

"Yes, because if we want to stay clean we need to get water from a different line, since the line we use currently does not produce water sufficiently enough to fill our needs." (Respondent 4)

"Yes, it has a great effect on our bathing procedures which in turn affects our health." (Respondent 9)

These responses highlight how inadequate water access affects daily hygiene practices which leads to potential health concerns. Without reliable access to clean and enough water, daily hygiene routines are affected. It shows that it leads to discomfort, inconvenience, and potential health risk.

Water shortages make it hard for residents to stay clean as Respondent 1 shares how they can't take regular baths and it affects their hygiene. Respondent 3 explains the struggle of finding another water source just to stay clean, while Respondent 9 points out how this disruption impacts their health. This shows that without enough water, people face greater health risks due to poor hygiene and increased exposure to diseases (Mattos et al., 2021).

#### 2) *On consumption of unclean water*

Consumption of unclean foodstuffs is not recommended for a person since it can cause multitudes of foodborne illnesses such as escherichia coli infection, botulism, salmonellosis, and so much more. This means that you should always wash your ingredients thoroughly before cooking it in order to prevent diseases and possibly parasitic infections to occur, therefore having a clean sufficient water supply can help in preventing these foodborne illnesses from occurring.

"For me water shortage has a huge impact on our health especially on our bodies if we have least or no water, example is if we have a headache there's a possibility that our organs in our bodies will be affected like the human body is made up of 60% of water so that's why our organs will also be affected also like in our basic daily use water is essential to stay hydrated so that's why and also personal hygiene we also need water to be clean and healthy so that we can avoid any illness that affects our health so that's how water shortage affects my health" (Respondent 1)

"If you have a prolonged water shortage, it can affect your health because you won't be able to clean yourself or your eating utensils like you should, so that could affect your health." (Respondent 2)

"Water shortage really has a lot of negative effect in our body, because for one, you can't cook, that is important, you can't bathe, your hygiene, you won't be able to do your proper hygiene, and all the things you do in the house that requires water; it would be impossible due to the water shortage, and especially your drinking water; of course even if we have to refill our water; if there is no supply of water; there will be no safe drinking water." (Respondent 3)

Without enough clean water, many people struggle to stay hydrated, keep their body to function properly and as well as in maintaining good hygiene which makes them more likely to get

health related effects. It also becomes more difficult to clean dishes and cook food hygienically, increasing the likelihood of contamination and illness.

Lack of water makes it more difficult for people to maintain their health, maintain proper hygiene, and store food safely. Simple activities like bathing, utensil washing, and staying hydrated become difficult when there is insufficient water available, which raises the risk of illness. Access to clean water is crucial for preventing illness and maintaining overall well-being because contaminated water used in food production can also spread dangerous bacteria (van Vliet et al., 2021).

#### C. *How do local residents mitigate the issue of hygiene-related health risks during water shortages, and what strategies or actions have they developed as a result?*

##### 1) *Mitigation through conservation*

Practicing water conservation is an effective and liable action or strategy when mitigating through water shortage, this action becomes effective as conserving water allows the residents to have a supply of clean water in times of water shortage. Respondents often state that saving or conserving water has benefited them in times when their water becomes limited. This type of action allows residents to still be able to access clean water. Responses below emphasizes this action:

"Save water" (Respondents 4, 6, 10)

"Like conserving water, refilling water in case of no water we can have something to use" (Respondent 5)

"Preserve water, provide water containers in the house." (Respondent 7)

These responses highlight the importance of conserving or saving water in times of water shortage. Individuals who have experienced water shortage have developed strategies that are able to mitigate the water shortages they are experiencing.

"Well, right now saving water is the only solution we have. We save water anytime we need it and hopefully the government will step in and help solve this problem." (Respondent 8)

"Save water, I have a water tank to save water for the evenings for us to use." (Respondent 11)

"For us, saving water is effective." (Respondent 12)

"Saving water is the only solution we have." (Respondent 13)

"Just save water even if there's no water, just save and don't waste too much." (Respondent 15)

"When facing water shortage, we need to save water so that we could use it to clean clothes, use the water from the laundry to clean the cr, and etc." (Respondent 20)

Additional responses emphasize how effective storing and conserving water is during the times when clean water becomes limited. These individuals who have experienced water shortage considered that one of the most effective strategies in saving water as part of mitigating through water shortage is by providing a water tank in order to store clean water. Respondent number 11 has complemented this by stating that they have secured water tanks in order to save water. As water agencies continue to explore opportunities to develop and

increase resilience and local water supply reliability in the face of drought and increased number of water shortage, conserving clean water is a strategy along with the reuse of treated municipal wastewater, these strategies have accumulated significant attention and adoption (Tran et al., 2017)

The responses collected have showcased an effective and liable strategy in mitigating through water shortage, multiple respondents claim that saving water is the strategy that have benefited them most in times of water shortage.

### 2) *Mitigation through informing the officials or the people in charge.*

The locals who have experienced water shortages seek the help of those people who have the power and the capabilities of finding and providing solutions for this issue. This theme emphasizes individuals who see that by informing the people in charge of providing water would also provide solutions for the lack of water supply. Respondents express their view on the possible solution for water shortage and that is by seeking assistance from the government officials to seek solution for the ongoing water shortage. They believe that the government is the one who can provide a solution for this occurrence. Responses below highlights these thoughts and ideas:

“Going to the barangay council for the water office and asking for their help.” (Respondent 2)

“Inform, inform whoever needs to be informed, for example, in ours the water works, inform the waterworks if there is a problem with the water.” (Respondent 3)

“The government needs to provide, to minimize the times when water will be turned off.” (Respondent 7)

These responses highlight the opinions of individuals who sought help from the government and the people who have the capabilities to provide solutions for the ongoing problem of water shortage. These respondents view the people from the government and water works to provide solutions as they have the capabilities to provide efficient and liable solutions for the water shortage the residents have experienced. They assume that by informing those in position is an effective strategy to solve the problem of water shortage.

“Well, right now saving water is the only solution we have. We save water anytime we need it and hopefully the government will step in and help solve this problem.” (Respondent 8)

“Call the ones that own and run the water supply, like the sources and call them that there is a water shortage.” (Respondent 17)

Further responses have expressed that saving water is their solution thus far, however, they still sought that the government would lend help to finally solve this ongoing problem residents in Guinsay and Guinacot are currently facing. Calling the people who provide water supply is a strategy which the residents see as an efficient way to solve water shortage in their area. The government both invested in many water infrastructures in order to explore the local water resources and also have tried to construct water transfer projects in order to overcome the uneven spatial distribution of water (Wang et al.,

2017). This is an example of when the government gets involved and provides a solution for water shortage.

### 3) *Mitigation through stocking up water*

The residents residing in areas where water shortage is a frequent occurrence, locals have viewed that stocking up clean water in case of water shortage happening is an effective strategy for mitigating through water shortage. This theme recognizes the effectiveness of mitigating through water shortage by stocking up clean water in preparation for the lack of clean water.

“Stock up a lot of water in the tanks, because once the water turns off, you’ll have other options to use.” (Respondent 1)

“Store Water (Respondent 14)

According to these responses who have experienced this occurrence, stocking up water is the most liable way to still be able to use clean water in times of water shortage. The simplicity and reliability of this method make it a preferred strategy in affected communities.

“I will store water. Every night I will fill the [water] dram with water for emergencies. We always follow up this concern to the officials but due to being busy, it’s just that. It will be helpful when there’s a big tank for water to let everyone access it.” (Respondent 18)

Moreover, all the responses highlight that storing water is a widely accepted and effective method of mitigating the effects of water. Additionally, while individual efforts are effective, larger communal solutions, such as water tanks, could provide broader access to clean water. These findings underscore the importance of both household preparedness and community action in addressing water scarcity.

### 4) *Mitigating through the use of a hand water pump.*

Water shortages are a significant challenge faced by residents in the affected areas, and one effective alternative to mitigate this issue is the use of hand water pumps, locally known as “poso.”. Residents use this alternative in order to still have access to water even though water shortage is happening. This theme highlights the effective alternative to access water.

“It’s really hard because we need to go to San Antonio or go down further to get water for our needs. Sometimes we will go to get water from “poso”. We also store water to use in our daily occasions like emergencies.” (Respondent 14)

“If there is no water, then we just do a hand water pump.” (Respondent 16)

As stated by a few residents, they use hand water pumps as a way to mitigate the issue during water shortages. The responses emphasize that the hand water pump is the best alternative to access water and is the most liable when cleaning.

“We usually wait for rain to come so that we can use water again. When we save water, it is easily drained out. But if we have extra money we will go and get water in the well. In which we usually save water from the rain.” (Respondent 19)

The findings clearly show that hand water pumps are an effective alternative that has become very widely accepted to mitigate the effects of water shortages. When no water is available, citizens will employ this technique in order to go



about their daily lives without interruption. These insights highlight the importance of maintaining and improving access to manual water pumps in communities affected by water shortage.

## 5. Conclusion

This study explored the effects of water shortages on hygiene-related health risks among local residents of Danao City. Limited water compelled residents in Danao City to adopt various coping mechanisms, such as conserving and storing water, yet these solutions are still not enough, especially during prolonged shortages. The study revealed that inconsistent water supply disrupts daily hygiene practices, making it difficult for residents to maintain cleanliness to the surroundings, and it increases their vulnerability to skin infections and other health risks. In addition, household chores such as cooking, washing clothes, and cleaning are severely affected, causing more trouble to the residents of Danao City.

In response to these challenges, residents have developed different strategies to mitigate the effects of water shortages, such as seeking help from local authorities and improving water conservation. Participants reported various hygiene-related health concerns, including skin infections and waterborne diseases, due to the use of unclean water.

### A. Recommendations

As we analyzed the gathered responses of the interviewees, all of them agreed that water shortage is a detrimental condition that affects the lifestyle of many and causes a multitude of problems to arise especially concerning health and hygiene. Thus, in order to mitigate this problem, we gathered helpful ways that water shortage can be mitigated based on the responses given to us. One way to mitigate this problem is through conservation. Water conservation can be a great help to fixing the problem of water shortage. Through conserving water and reducing waste, we can in turn reduce the amount of waste that could have potentially been useful such as reusing laundry water for watering plants. This and a lot more benefits can be provided through smart usage of water. Another way is properly storing water, this is a great contributor in negating the negative effects of water shortage. Having a stockpile ready for emergency use is beneficial to the residents who experience this kind of problem so that they have something to use when water shortage does strike. A different solution is to address the problem to the people in charge, the government or the people managing water distribution such as the 'Maynilad Water Services, Inc.' has the right to revoke access to clean water and the rights for distribution. Thus, if you have problems regarding lack of water these are the main agencies or authorities you should turn to in order to fix said issues. Lastly, the most important is to create your own solutions, one of the ways to solve a problem is to create a solution to address said problem. For example, installing a water pump or generator to gain access to water and creating a water filtration system in order to be able to obtain feasibly

clean water.

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