I. Background

This report presents a comprehensive overview of the Local Climate Change and Health Assessment as the result of collaborative efforts between the Municipality of Alabat and the Climate and Health team at the St. Luke's Medical Center College of Medicine - William H. Quasha Memorial. With a shared commitment to building the municipality's climate resilience, especially its health systems, this collaboration was initiated in June 2022 to 1) co-diagnose the current impacts and future threats of climate change on the well-being of Alabatins and 2) co-design locally relevant climate-adaptation strategies that maximize its health co-benefits.

By employing a multifaceted approach including stakeholder consultations, interviews, document reviews, and field visits, this climate and health assessment primarily focused on two key aspects: the prioritization of Alabat's climate-related hazards and corresponding climate-sensitive health conditions, and the co-designing of potential adaptation strategies implementable from the individual- to health-systems levels. he outcome of this assessment is hoped to align with the proposal to leverage the People's Survival Fund. This funding opportunity can serve as a critical step to propel Alabat's efforts to build climate-resilient health systems.

The Municipality of Alabat and St. Luke's MCCM-WHQM embarked on a collaboration in 2022 with the primary aim of building the climate resilience of its health systems, engaging the different sectors to explore and understand the municipality's experience of climate change and its impacts on the health of Alabatins

II. Methodology

Throughout the project duration, the Municipality of Alabat and SLMC collaborated on diverse activities to support the goal of building climate-resilient health systems. The initial phase of the project was to co-diagnose the current impacts and future threats of climate change on the health of Alabatins. This phase involved performing a situational analysis, wherein local data on the intersection of climate change and health were collected and analyzed through a health lens. The succeeding phase of the project was to co-design locally relevant climate adaptation strategies that maximize health co-benefits. Both phases involved workshops, interviews with key stakeholders, consultations with stakeholders representing different levels and communities, reviews of municipal documents, field visits, and regular communication with the municipality's point persons. This process was iterative and non-linear, allowing adaptability in response to feedback from the Municipality.

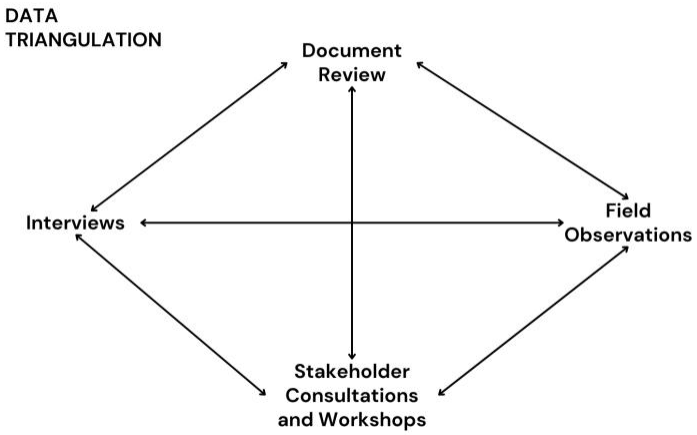


Figure 1. Methodology for data triangulation

To capture a well-represented view of how climate change is experienced in Alabat, a wide range of stakeholders from the municipal offices to the barangay healthcare workers residing between Barangay Poblacion and Barangay Villa Norte were engaged in **interviews and consultations** (see Table 1 for the list of stakeholders engaged). Stakeholders shared their personal and collective experiences with climate-related events (such as typhoons and extreme heat), how these affected their daily lives, especially their health, and how they coped through various adaptation or mitigation measures. Their lived experiences were supported by quantitative data gathered and analyzed from the **document reviews,** which provided 1) objective baseline information on the municipality's climate-related hazards and 2) insight into how climate change and health issues are incorporated into the municipal plans (see Table 2 for the list of documents reviewed). series of in-person and online **workshops** facilitated in-depth group discussions, stakeholder consultations, and validation of the team's findings. Finally, the research team's **field observations** through site visits, guided tours, and walkthroughs helped corroborate findings from the stakeholder interviews, consultations, workshops, and document reviews (see Figure 1).

After an initial analysis of the collected information, the municipality's climate-related hazards and climate-sensitive health conditions were identified. Relevant climate-health historical data, future projections, and people's lived experiences were collated and charted to generate the "Climate & Health Prioritization Matrix" (see Annex X)). The matrix was presented during stakeholder consultations, and each component was scored and ranked by the municipal-level stakeholders. This process identified which climate-related hazards and climate-sensitive health conditions should be prioritized by the municipality's People's Survival Fund project (see Tables 3 & 4 in the next section).

The criteria used to score the climate hazards were adopted from the Hazard Prioritization Matrix, a tool from the Disaster Risk Reduction and Management in Health (DRRM-H) Planning Guide, which includes "severity", "frequency", "extent", "duration", and "manageability" (Department of Health, 2019, p.12). Meanwhile, the criteria used to score the climate-sensitive health conditions were obtained from the Center for Disease Control and Prevention's module

on Prioritizing Public Health Problems (CDC, 2013). The criteria used include “seriousness”, “impact”, “capacity to respond”, and “size.” These were then scored considering the current burden and future risk of the hazard and health condition to the municipality using a 5-point scale. The hazard and health condition with the highest score was ranked first, while that with the lowest score ranked last.

Table 1. List of stakeholders engaged in the interviews, consultations, and workshops

Stakeholders Engaged
Municipal Mayor
Municipal Department Heads and Staff: Health Office, Environment and Natural Resources Office, Planning and Development Office, Disaster Risk Reduction and Management Office, Engineer’s Office, Agriculture Office
Health representatives of the Sangguniang Bayan
Municipal Planning Council
Barangay Officials, Health Workers, and Nutrition Scholars
Civil Society Organizations
Residents of Alabat

Table 2. List of municipal documents reviewed and analyzed with a climate-health perspective

Documents Reviewed
Local Climate Change Action Plan (LCC P)
Local Investment Plan for Health (LIPH)
isaster Risk Reduction and Management (DRRM) Plan
isaster Risk Reduction and Management in Health (DRRM-H) Plan
Comprehensive Land Use Plan (CLUP)
Comprehensive evelopment Plan (CDP)

III. Situational Analysis

The initial phase of the project was to co-diagnose the current impacts and future threats of climate change on the health of Alabatins through a situational analysis using the Climate and Health Prioritization Matrix (CHP Matrix) and Rapid-analysis Guides for municipal documents.

A. Climate-related Hazards

Due to its geographical location, Alabat is prone to various hazards including flooding, rain-induced landslides, storm surges, earthquakes, and liquefaction (CLUP, 2020). The

stakeholder consultations utilized the CHP Matrix to identify the most pressing climate-related hazards summarized in Table 3 In order of decreasing priority, the top five climate-related hazards are extreme heat, flooding, heavy rainfall, sea level rise, and storm surge.

Table 3. Top climate-related hazards in the Municipality of Alabat

Climate hazard	Current Burden (total)	Future Risk (total)	Total Score (CB+FR)	Rank
Extreme heat	16	37	53	1
Flooding	16	34	50	2
Heavy rainfall	16	33	49	3
Sea level rise	11	26	37	4
Storm surge	10	24	34	5

B. Climate-sensitive Health Conditions

Several climate-sensitive health conditions were co-diagnosed by municipal stakeholders, consisting of both communicable and non-communicable diseases. The LIPH notes that Alabat is facing “an epidemiologic transition characterized by a double burden of disease[1].” The use of the CHP Matrix revealed hypertension as the topmost health condition of concern, followed by respiratory conditions. Dengue, water-borne diseases, and heat-related illnesses ranked third, while malnutrition ranked last.

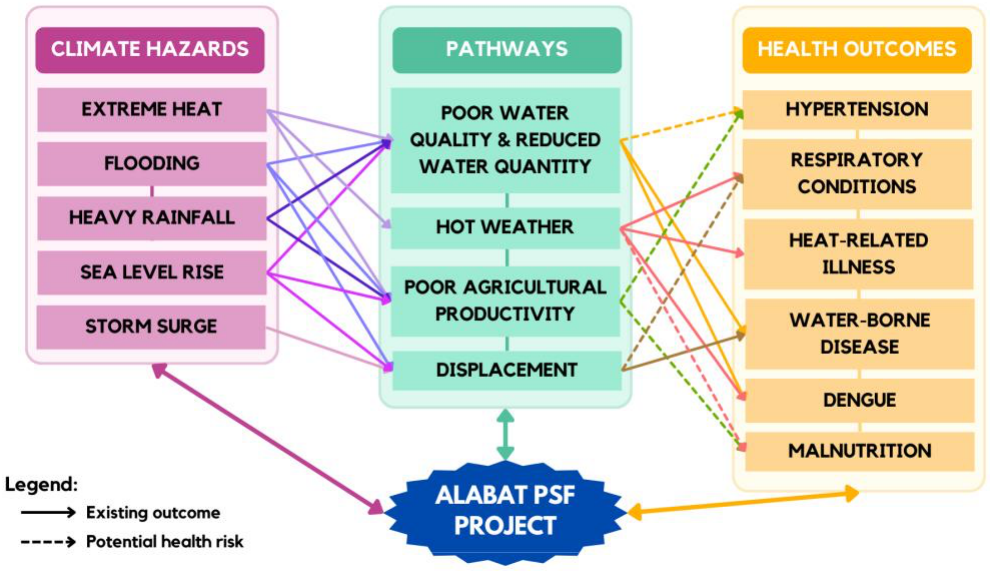
Table 4. Top climate-sensitive health conditions in the Municipality of Alabat

Health condition	Current Burden (total)	Future Risk (total)	Total Score (CB + FR)	Rank
Hypertension	15	19	34	1
Respiratory conditions	13	16	29	2
Heat-related illness	12	15	27	3
Water-borne disease	12	15	27	3
Dengue	12	15	27	3
Malnutrition	13	13	26	4

[1] The coexistence of communicable and non-communicable diseases

C. Hazard-Health Linkages

The situational analysis revealed the various pathways in which the different hazards result in the following health outcomes in the municipality. Through information from lived experiences and municipal documents, the research team delved into the actual effects of climate-related hazards in Alabat and identified the intermediate factors contributing to the prevalence of the identified health conditions. Figure 2 visualizes these possible linkages, showing existing outcomes and potential health risks as depicted by solid and broken arrows, respectively. Existing outcomes are findings that are documented and have been reported by stakeholders while potential health risks are health conditions that may emerge given the hazards and pathways and have not been reported. An example of this is respiratory disease transmission that may occur during evacuation. The figure also presents the interconnectedness of the different outcomes as represented by the vertical line between the hazards. This reflects the phenomenon wherein multiple climate hazards occur at the same period and usually, one hazard is being caused or aggravated by the other. As a result, these hazards pave the way for several intersecting pathways that contribute to not just one, but multiple health conditions. For instance, heavy rainfall may lead to flooding, and hot weather may result in poor water quality, reduced water supply, and poor agricultural productivity. Meanwhile, certain illnesses may induce or worsen other health conditions, such as when respiratory illnesses result from water-borne diseases (CDC, 2023) or malnutrition increases a person's vulnerability to water-borne diseases (Selim, 2022). By capturing these dynamics, the municipality can obtain a holistic view of its climate change and health risks and develop a PSF project with adaptation strategies that employ a multisectoral and multi-hazard approach. The next paragraphs will expound on these individual relationships in more detail.



Extreme Heat, Heat-related Illness, & Hypertension

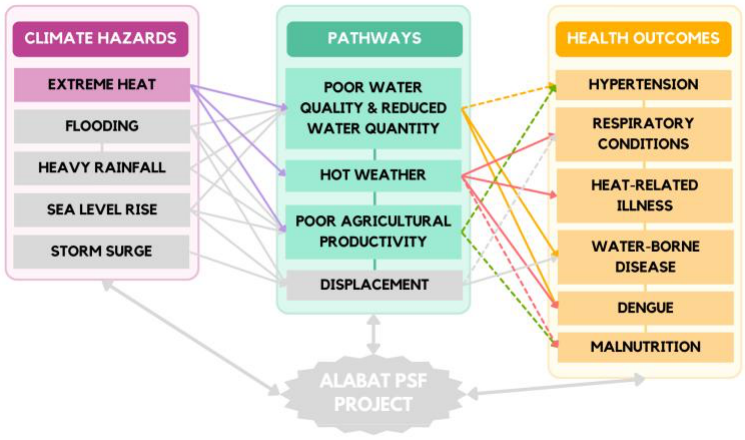


Figure 3. Pathways in which extreme heat influences health OR
Extreme heat, its pathways, and health outcomes?

Extreme heat ranked as the top climate hazard of concern for the municipality of Alabat. In contrast, extreme heat is not usually identified as a hazard in municipal plans like the Local Climate Change Action Plan (LCC P) and the local DRRM plan. However, Alabat's Comprehensive Land Use Plan (CLUP) 2020-2030 **confirms the municipality's vulnerability to increased temperatures and drought**. Additionally, the CLUP identifies the need **to monitor extreme temperatures due to the risk of heat-related illnesses**.

> "*It is important to monitor the occurrences of extreme temperature in a locality as prolonged exposure to extreme heat, for instance, pose adverse effects on human health which may cause heat-related diseases and death*." (Alabat CLUP 2020-2030 (Vol. 3), p.118)

The effects of extreme heat are **widely experienced and detrimental to livelihoods dependent on weather conditions,** particularly agriculture and fishing **affecting the quality and quantity of crop yield and fish catch**. As fewer fish and marine life are found in usual fishing areas due to warmer temperatures, fisherfolk are forced to venture farther into the open sea.

> "'*Pag 'yung init po, grabe po ang init niya. Mas matindi po ang init. Itong [taon] lang, medyo malalim siya sa balat*." (Farmer/fisherfolk)

> "*Naunti po yung kanilang nahuhuling isda, siguro dahil sa init. Kung saan napunta yang mga isda na yan*." (Fisherfolk association officer)

Moreover, as emphasized in the municipality's CLUP, **extreme heat impacts people's health, placing outdoor workers at high risk of heat-related illnesses** such as heat stroke, heat cramps, and heat exhaustion. Equally important, **even individuals staying inside the comfort**

of their homes have reportedly experienced discomfort from the heat, especially among elderly people. These are commonly experienced in houses made of light materials which often do not have proper insulation and/or ventilation. This concerns a municipality like Alabat with hundreds of houses reported to be built within such conditions. Figure 4 presents the annual maximum heat indices recorded in Alabat within a 19-year period.

> "*Iba po ang init dito tapos kaya din po nabanggit nila at makikita din po sa records na parang mga heat stress, or mga heat stroke yung isa sa mga concern po talaga lalo na po na madami na farmers, fisherfolks po edi talaga pong kailangan nilang nasa labas po pag mga ganitong work nila, hindi po sila maka-iwas nga sa init po ng araw.*" (Health official)

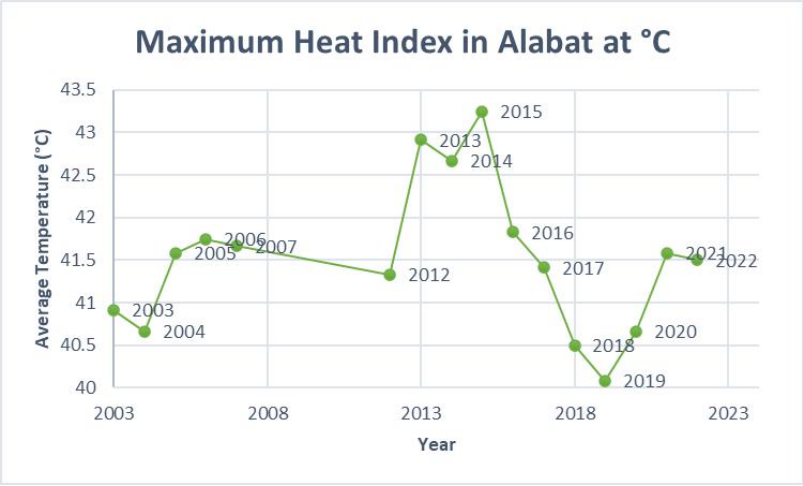


Figure 4. Maximum heat index in the Municipality of Alabat from 2003 to 2022 (source: Graph was drawn based on data from DOST PAGASA)

Furthermore, patients with pre-existing hypertension and other cardiovascular conditions are especially vulnerable to extreme heat, as **warmer temperatures may trigger result in hypertensive episodes**. "*Katulad po nung aking kapitbahay. [...] Sa sobrang init at pagod niya, bumili sa akin ng yelo… dahil ako po ay may tindahan. Hindi po tumagal. Siguro mga isang minuto lamang, [...] maya- maya nagpapahabol na. Dinala na sa hospital dahil siya ay hypertensive,*" shared a barangay health worker.

<u>Additional Health Risk</u>

When exposed to extreme heat, access to water is crucial to mitigate heat stress. Water intake keeps the body hydrated and better able to tolerate heat while taking showers helps cool the body down. However, municipal officials have raised the issue of water shortage during the dry season. An unsteady supply of clean tap water may reduce the residents' ability to adapt to warmer temperatures.

Heavy Rainfall, Flooding, Dengue, & Water-borne Diseases

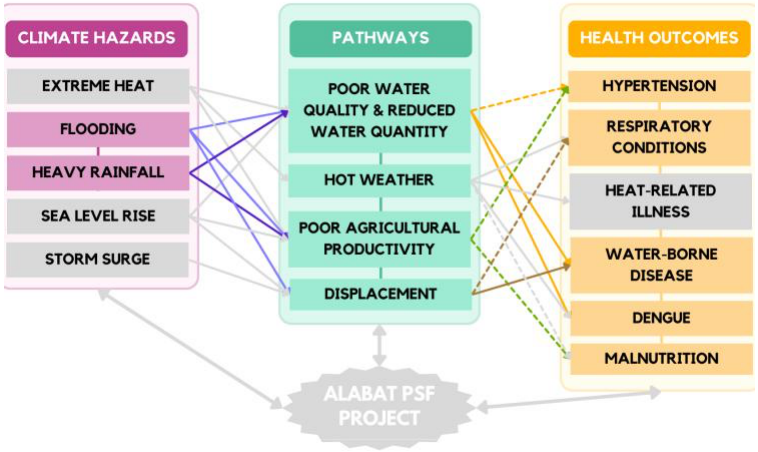


Figure 5. Pathways in which heavy rainfall and flooding influence health

As a municipality with 15 coastal barangays, flooding was identified as an urgent concern together with heavy rainfall, as **flooding often occurs when high tide levels coincide with large amounts of rainfall**. It has also been noted by local stakeholders that recently, there has been an **increase in the volume and duration of rainfall**. Residents of Brgy. Poblacion observed that areas that were previously flood-free have recently started to experience frequent flooding.

> "*'Yung pong ulan ay nito pong mga nakaraang buwan at saka sa kasalukuyan, bigla pong dumami ang ulan natin. Bigla ang binagsak ang maraming tubig na lagi dahilan ng paglaki ng tubig sa ilog at kabahayan."* (Farmer/Fisherfolk)

> "*Kung minsan dito nagwa-walo walo, 'yung walong araw na dere-derecho ang ulan. Kaya ang lakas. [Dati] madalang po, pero ngayon halos lagi na. Ilang araw na dere-derecho ang ulan. Problema po sa pag-ulan, 'yung tanim namin naapektuhan na.*" (Farmer/Fisherfolk)

Aside from heavy rainfall, flooding in the Poblacion area has also been **worsened by non-adaptive, "*decades-old*" drainage canals that cannot channel and hold large volumes of rainwater**. It ultimately causes damage to property and temporarily displaces residents of flood-prone barangays like Brgy. Poblacion Tres.

The municipality's Climate and Disaster Risk Assessment confirms that **the municipality has areas with high vulnerability and moderate-to-high risk of flooding** (Figure 6), which reflected the need for flood control projects as proposed in their Comprehensive Development Plan (CDP). Several of the municipality's projects, programs, and activities (PPAs) are focused on mitigating and adapting to floods such as forest protection and rehabilitation, strict

implementation of policies on illegal logging, and construction and improvement of drainage canals.

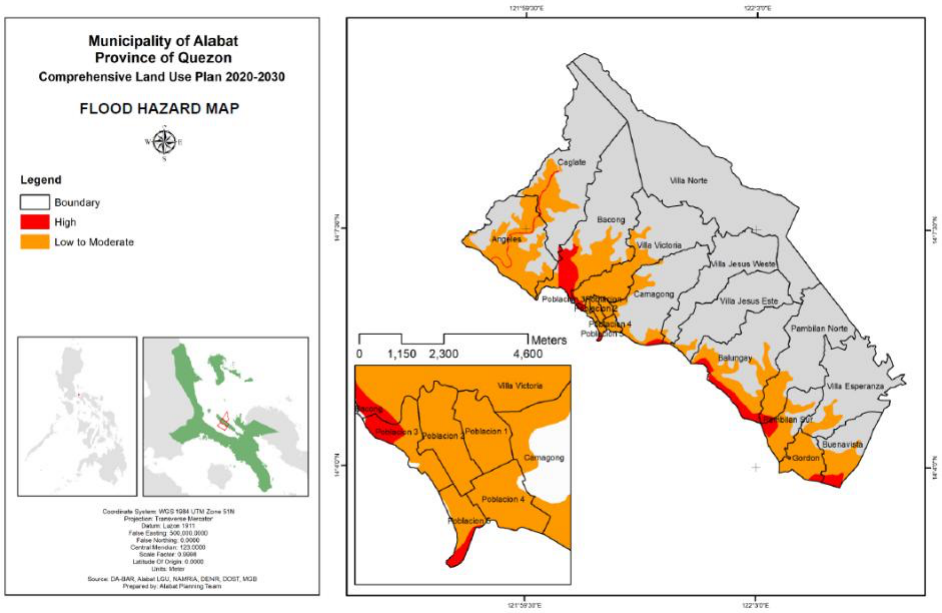


Figure 6. Flood Hazard Map of Alabat, Quezon
(Source: Alabat CLUP 2020-2030)

Heavy rainfall and flooding likewise threaten Alabat's agriculture and fishing sectors which contribute to most of the municipality's revenue. **Crops get inundated for relatively long periods resulting in lesser quantity and poorer quality of harvest**. For instance, in rice farming, flooded fields harbor pests (i.e. Golden Kuhol) that destroy the quality of the crop. On the other hand, heavy rainfall also **disrupts fishing and endangers the lives of local fisherfolk**.

> "*Kapag sa palayan naman, masama din naman po ang masyado maraming tubig. At 'yan po ay sinusugod ng mapamuksang kuhol. 'Yun ang pumapatay ng palay*." (Farmer)

The combination of heavy rain and flooding poses multiple health risks to the municipality of Alabat. Though no case has been documented, residents are at risk of **contracting leptospirosis during floods**. In addition, while floodwaters subside relatively quickly within Poblacion, areas that do not have sufficient drainage end up storing the water which could **harbor mosquitoes and increase the risk of dengue**.

Moreover, **water-borne diseases can also be contracted in designated evacuation sites**. Water sources in these sites may be unsafe for consumption, testing positive for coliform and other bacteria that could result in diarrhea (Miasco & Ambrad, 2018). Furthermore, flooding also contaminates groundwater sources that feed into the water system. Local stakeholders have observed bouts of **murky water coming from the tap during instances of heavy rainfall**

which was often resolved after a few hours. Although the majority of the households in Alabat source their drinking water from refilling stations, there is still a risk of getting diarrhea from contaminated tap water **for some residents in rural barangays who do not have the option to buy from water-refilling stations.** Contact with murky water could also **increase the risk of contracting skin diseases** like fungal infections and cellulitis because of unseen pathogens present in the water.

Additional Health Risks

The municipality does not have a sewage and wastewater treatment system. The current practice is to discharge raw sewage into the outdated drainage canals which may mix with floodwaters. Exposure to raw sewage is another health risk to residents of Alabat.

OTHERS

Sea Level Rise

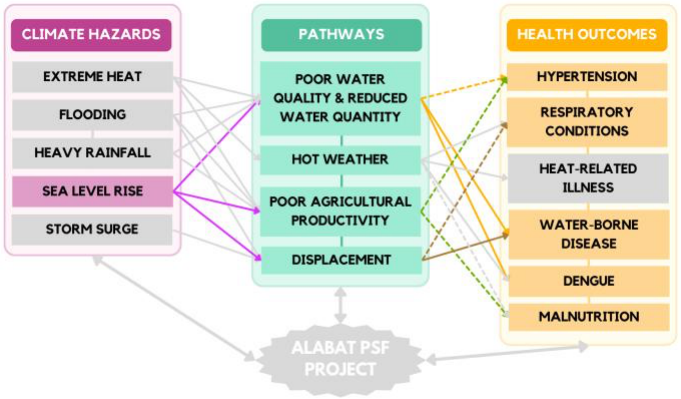


Figure 7. Pathways in which sea level rise influences health

Alabat is only one of many island municipalities vulnerable to rising sea levels yet such a climate hazard is **not reflected in the municipal documents due to lack of data**. "*No data available on sea level rise in the LGU. Further, no data have been secured from NAMRIA at the time of this writing*," as stated in CLUP volume III. Regardless, sea level rise was ranked as the 5th most pressing climate hazard because of **their experience with "high tide flooding"** which occurs when water levels exceed the normal high tide mark (NOAA, 2023).

> *"Dati po, yung terrace namin hindi po naabot [ng tubig galing sa ilog]. Simula nung ako'y isilang. Tapos nito lang February, dumapo po yung tubig. [...] Pero yun ay high tide naman pero naman, nung dating high tide, hindi naman ganon kataas ang lebel ng tubig.*" (Barangay official)

Rising sea levels not only **threaten the municipality's agricultural productivity** but also cause **distress to rice farmers**. In one of the stakeholder consultations, a barangay official,

who was also a farmer, shared that **rice fields have occasionally been inundated with seawater** and emphasized the importance of shoreline protection.

Figure 8. Old coconut stumps reached by the tide show signs of rising sea levels

Moreover, **some signs of sea level rise can also be observed** around Alabat. For instance, in Barangay Poblacion 5, stumps of coconut trees can be found beside docked fishing boats, with a few almost submerged (See Figure 8). This indicates that coconut trees used to line further into the foreshore and sea levels have risen to where these trees used to stand.

Storm Surge

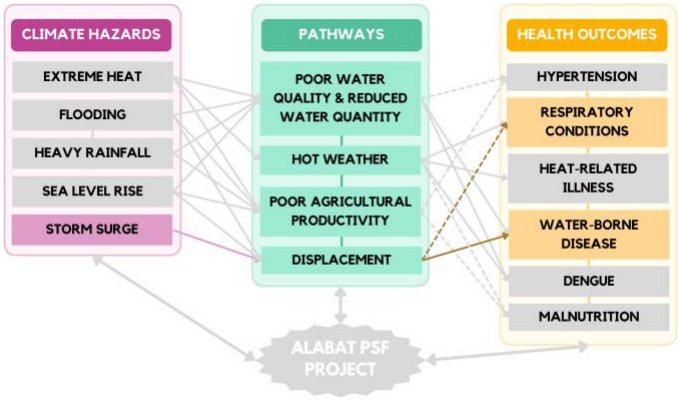


Figure 9. Pathways in which storm surge rise influences health

Besides sea level rise, another hazard that threatens the coastal barangays of Alabat is storm surge. So far, the CLUP has only recorded one occurrence in 2005 brought by Typhoon Pepeng. However, residents from Barangay Villa Norte strongly remember the storm surge in 1995 during Typhoon Rosing. While it has been 19 years since the last storm surge, residents of

barangay Villa Norte still strongly agree that storm surge is a major present-day hazard of concern and such vigilance may be due to the threat of **long-term effects on property and livelihood**, as expressed by barangay stakeholders.

> "*Natatakot kapag nangyari ulit [ang storm surge]. Masisira po ang pagtatanim, ang niyogan. So affected din po sila. Hindi na makakapangisda. Halos lahat ay masisira. Okay kung nakakaangat ka sa buhay, pero mauubos din 'yun eh.*" (Barangay councilor)

Malnutrition

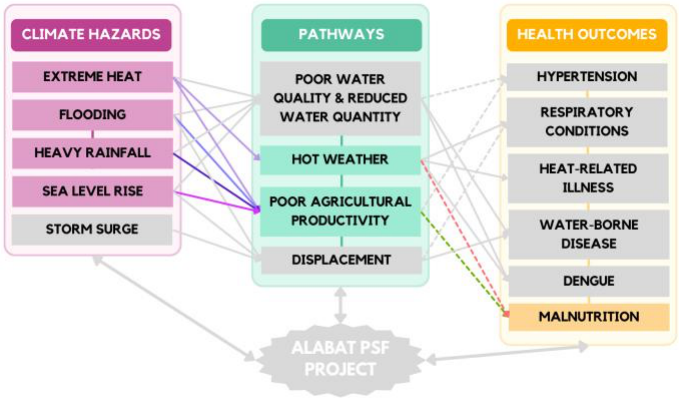


Figure 10. Hazards and pathways that influence malnutrition

In general, Alabat has a **low prevalence of malnourished children**. However, increasing rates of underweight, stunted, severely stunted, moderately wasted, and severely wasted children were recorded in 2021 (See Table 5). Stunted children had the highest prevalence representing almost 10% of the children's population.

Table 5. Nutritional status of children in Alabat (2019-2021)

Nutritional Status	2019		2020		2021	
	No.	%	No.	%	No.	%
Underweight	40	3.1%	48	3.7%	54	4.43%
Severely Underweight	11	0.9%	17	1.3%	15	1.23%
Stunted	189	14.8%	126	9.8%	129	10.60%
Severely Stunted	52	4.1%	37	2.9%	43	3.53%
Moderately Wasted	34	2.7%	43	3.3%	53	4.35%
Severely Wasted	10	0.8%	17	1.3%	21	1.73%

Source: eFHSIS

Multiple climate hazards, including heavy rainfall, flooding, extreme heat, and sea level rise, **threaten agricultural productivity and supply** in the municipality. As a result, this **affects**

Alabat's access to cheap and high-quality food products. Residents may also be restricted to food products that can only survive the current climate conditions, overall **reducing diet diversity**. Diverse diets are critical to growing children to ensure sufficient macro and micronutrient intake (Niles et al., 2021).

While access to healthy food can be limited by supply, it is also **highly dependent on the economic capacity of households**. Some families rely on the feeding programs by the government, often offered by the Department of Education (DepEd) and the Department of Social Welfare and Development (DSWD). However, in some barangays, this service is irregular due to a **lack of supply of food and dietary supplements** (e.g. vitamins), as explained by stakeholders. More importantly, stakeholders highlighted **children's preference for instant and preserved food** which contributed to their poor nutritional status. As emphasized by a barangay official, "*'Yung malnutrisyon dito, nasa [pagpapalaki] ng magulang. Minsan ang mga bata, wag lang makulit, wag 'sundan ang mga gustong bilhin…mga candy.*"

> "*Pero kung ngayong first quarter [...] nadagdagan na naman [ang malnourished]. [...] Dahil po, ma'am, katulad po sa isang pamilya. Minsan po, di man po natin ano 'yung sa kanila pong hanapbuhay, [...] kulang yung pambili dahil po sa panahon ngayon.*" (Barangay nutrition scholar)

Respiratory conditions

According to the LIPH, **respiratory conditions are among the top ten leading causes of mortality and morbidity in labat** from 2019 to 2021. Respiratory conditions include acute respiratory infections, pneumonia, and chronic obstructive pulmonary disease (COPD). There have also been sporadic cases of tuberculosis across the municipality, whereas the incidence of asthma was found to have worsened.

> "*Meron po [kaso ng TB]. May gamutan naman po silang anim na buwan. [...] Namomonitor din po kaagad. Finoforward po sa amin kung sino yung merong confidential na tao, 'di kami lang po nagtatapos.*" (Barangay health worker)

Several hazards can result in various respiratory conditions. Extreme heat can result in the **buildup of air pollutants (e.g. ozone and pollen) that may trigger and worsen conditions** like seasonal allergies, asthma, and COPD. Meanwhile, **temporary displacement** to crowded evacuation centers due to typhoons **increases the risk of transmitting infectious respiratory illnesses** including tuberculosis and pneumonia.

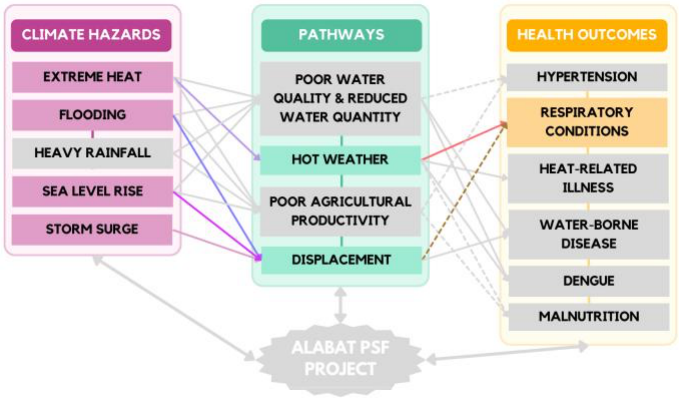


Figure 11. Hazards and pathways that influence respiratory conditions

D. Health System Building Blocks

The operationalization of the health system building blocks in the municipality were assessed to identify gaps and opportunities to incorporate climate action at the local health system level. Table 6 summarizes the status of each building block followed by the gaps in considering climate impacts and action. These were identified after a detailed examination and analysis of the findings from the LIPH and the stakeholder consultations.

Table 6. Health System Building Block ssessment

Building Block	Findings
Health Service elivery	The municipality implements multiple programs: National Immunization Program, Family Health Programs, Infectious Diseases Control and Prevention, Non-Communicable Disease Management and Control Programs, Specialty Care Programs, Environmental Health and Safe Setting Program, Disaster Risk Reduction and Management in Health (D M-H), Health Promotion, and Health Facility Development. Each program also has its respective sub-programs, and all these face several challenges to implementation, which include: ● Low level of knowledge and understanding of patients with diseases and the significance of health services and treatment have led to hesitancy in availing of health services (i.e., vaccines, consultations, etc.). ● The lack of financial resources for health personnel, supplies, facilities, services, and training to successfully mobilize the program. ● Complementary health programs are not being implemented. ● Poor monitoring of outcomes due to private consultations and procurement of health commodities.
Health Workforce	The municipal health office is faced with a significant lack of manpower. There are X doctors and 3 midwives, while there are no nurses, dentists, or medical technologists.

Information Systems	The municipal health office is equipped to use the electronic Field Health Service Information System (eFHSIS) and Integrated Clinic Information System (iClinicSys). However, desktop computers are non-functional and the internet connection is unstable, challenging the use of the said health information systems. Moreover, there is still no Municipal Epidemiology Surveillance Unit (MESU) in Alabat.
Supply Chain & Logistics Management & Health Regulation	Licenses to operate and health facility accreditations have expired and were not renewed in 2021 due to significant manpower changes. National laws have also been adopted at the local level but enforcement and monitoring are weak.
Financing	The local health budget is lower than the mandated 15% allocation of the National Tax Allotment, amounting to only 5.48% in 2021. Although there are other fund sources (i.e., GAD fund, MDRRMO fund, and special health fund) to compensate for the lack of financial resources, these are still insufficient. Hence, the dependence on provincial and national government assistance. Additionally, there is low PhilHealth coverage in the municipality.
Leadership/Governance	Local health boards are activated, however, functions are not fulfilled.

As the municipality strives to implement different decentralized programs for health and strengthen its local health system, it faces the common fundamental issue of funding. Being a fifth-class municipality, Alabat has very limited funding. which, can be rooted in the lack of political will to prioritize the health sector. Unless these challenges are addressed, the resilience of the municipality's health system towards climate-related hazards and health impacts will continue to be compromised. There will also be limited opportunities to mobilize climate action in the health system.

IV. Analysis of Plans

A review of selected plans and documents of the municipality determined how aligned the priorities and actions of climate-related plans are with the health plans. Specifically, the current draft of the Local Climate Change Action Plan (LCCAP) 2018-2028 was reviewed through a health lens – examining how health is considered and prioritized in climate-related plans. Inversely, the Local Investment Planning for Health (LIPH) 2023-2025 was reviewed through a climate lens – assessing how municipal-level health plans and budgets consider and prepare for the current and expected health burden from climate impacts.

A. Health Analysis of the Local Climate Change Action Plan (LCCAP)

The incomplete draft of the LCCAP lacked sufficient information for a comprehensive climate and health assessment. While the draft includes a detailed background on Alabat, covering its physical and environmental profile, demographics, economic trends including health services, and LCCAP Planning Framework, there were major gaps beyond "Section 4. Situational

Analyses." Specifically, information on Alabat's hazards, disasters, vulnerabilities, adaptive capacity, and more was unavailable.

A review of the existing information indicates that the LCCAP aligns with a progressive vision for Alabat, grounded in its core values such as God-centeredness. Notably, the objectives and adaptation measures emphasize Alabat's commitment to its agri-industrial and agri-tourism sectors. Examining the LCCAP through a health lens reveals the gap in addressing the health implications of climate change and exploring potential interventions that could alleviate health benefits. While the LCCAP is presently undergoing review, this assessment can serve as a valuable guide to inform the final draft, ensuring the incorporation of pertinent health data, engagement of the health sector, and leveraging of adaptation measures with health co-benefits.

For Ajuy, create a simple table focusing on the health gaps

B. Climate Analysis of the Local Investment Plan for Health (LIPH)

Aside from providing an overview of the health situation and context to the local health system, the LIPH also supplies background information on Alabat, specifically, its demographic profile, economic situation, and hazards present. Examining the plan through a 'climate lens' shows that climate-related hazards and climate-sensitive health conditions are not categorically identified and related to climate change. dditionally, while there are regular functions that align with climate adaptation, these are very few, and there are no climate mitigation measures included. However, disaster readiness is embedded in the operationalization of the health system building blocks.

Furthermore, there are gaps in the LIPH that hinder building climate resilience in the local health system. Examples of these are the lack of funding, the absence of a municipal epidemiological surveillance unit (MESU) and disease surveillance officer (DSO), and the limited use of climate data in analysis, among others. Nonetheless, a detailed examination of the LIPH priorities and interventions allowed the identification of "entry points" for climate-smart and climate-resilient measures. These are summarized in the table below.

Table X. Summary of climate-smart and climate-resilient measures for the LIPH

Building Block	Suggested Climate-smart and Climate-resilient Measures	LIPH Intervention Entry Points
HEALTH SERVICE DELIVERY	Mental health services and support	● Adolescent counseling ● Healthy Young Ones Training
	Preparedness and response plans for high-risk seasons and extreme weather events (EWEs) (e.g. Heat Health Action Plan, guidelines in addressing special needs of mental health patients during	● Risk assessment training (PhilPEN) ● Regular monthly random bacteriological examination of water sources

Building Block	Suggested Climate-smart and Climate-resilient Measures	LIPH Intervention Entry Points
	emergencies)	• Training on Mental Health and Psychosocial Support
	Awareness campaigns on: • Environment - health & wellbeing • Population, health, & environment (PHE) • Climate change - health & wellbeing	• Health promotion and behavior change for adolescents • Family Planning counseling • Advocacy on Health Wellness • Food handler's class • World Mental Health Day Celebration • Advocacy campaign on lifestyle-related diseases
	Enhanced monitoring and surveillance of the health status of vulnerable populations (e.g. patients with respiratory conditions and NCDs)	• Ante natal registration with Mother and Child Book • Monthly weighing and height/length measurement (0-23; 0-59 months) • Screening and Early Detection • Risk Screening for Hypertension
	Mapping surveillance data with climate data	
	Detection and monitoring Emerging and e-Emerging Infectious Disease (EREID), including climate-sensitive health conditions	• EREID: Procurement of supplies and medicines
HEALTH FACILITY EVELOPMENT	Assessment and retrofitting of facilities to sustain EWEs, warmer temperatures, and other environmental changes	• Construction and Equipping of Main Health Center Phase 3 (Laboratory) • Construction and Equipping of RHU Health Emergency Management System (HEMS) and Operation Center (OpCen) • Expansion/Demolition and Construction of Satellie/New BHS
	Procurement of equipment for diagnostic tests of climate-sensitive health conditions	
HEALTH WORKFORCE	Capacitating community and BHWs in providing psychosocial support for disaster- and trauma-exposed populations	• Training on Mental Health and Psychosocial Support • Hiring of Senior Health Program Officer
	Climate change & health training	
HEALTH INFORMATION SYSTEMS	Use of energy-efficient equipment	• Creation of Position/Procurement of Equipment • Purchase communication equipment
	Procurement of backup systems sufficient to support the facility's demand for at least three days	
	Climate change & health training	• Capacity Building/Development

Building Block	Suggested Climate-smart and Climate-resilient Measures	LIPH Intervention Entry Points
SUPPLY CHAIN & LOGISTICS	Use of energy-efficient equipment	• Procurement of Upright refrigerator
	Procurement of other devices and equipment that monitor indoor temperatures, cool existing buildings and spaces, and increase indoor air flow	• Procurement of thermohydrometer
LEADERSHIP & GOVERNANCE	Appointment of climate and health focal points	• Interlocal Health Zone Meeting; Local Health Board Meeting • Municipal/Barangay Leadership and Governance Program; Regular barangay health board meeting

V. Potential Adaptation Strategies

Adaptation strategies must take a multi-level approach where all stakeholders contribute and work harmoniously to solve problems that cut across sectors. An integrated and harmonized solution on every level is central to creating a synergistic effect, resulting in more impactful benefits. For these strategies to produce beneficial results (e.g. improving blood pressure control among hypertensives and decreasing the number of people with respiratory diseases), adaptation strategies must be facilitated on all levels through collaboration among agencies. After all, health is not solely the responsibility of the health sector. The following section presents relevant adaptation strategies at all levels, with an extended version available in the annex.

A. For climate-sensitive health conditions

I. Hypertension

A. Individual & household level

a. Adopt a healthy lifestyle to decrease the risk of developing hypertension

- Eat a well-balanced diet, exercise regularly, limit alcohol intake, avoid cigarette smoking, get enough sleep, and maintain a healthy weight.
- Improved sweat evaporation, body cooling, and heat dissipation were noted among hypertensive patients who underwent moderate-intensity exercise in hot conditions (Fonseca et al., 2015).

b. Undergo general health check-ups to manage risk factors for hypertension and/or regularly take maintenance medication/s if prescribed, to maintain blood pressure control

- Take medications as prescribed by the doctor and undergo regular medical consultation to ensure blood pressure control and manage symptoms, if any.
- General health checks are associated with increased chronic disease recognition and treatment, risk factor control, preventive service uptake, and improved patient-reported outcomes (Liss, 2021).

B. Community/Barangay

a. Participate in community support groups for people with hypertension

- Promote peer support and accountability by forming and joining community support groups.
- Being involved with organizations has been shown to improve blood pressure control (Valdés González et al., 2020).

b. **Organize and participate in physical activity classes to help with blood pressure control**

- Organize and participate in Zumba or aerobic classes at least 4 days a week.
- *Galaw Galaw Araw Araw* exercise videos culled from household chores, such as washing clothes, sweeping the floor and caring for the children, as well as an exercise video dubbed as *Banat ni Lolo, Hirit ni Lola* for senior citizens may be disseminated to encourage physical exercise. These videos may be flashed on V screens in government buildings/health care facilities while individuals wait in line.
- Unconventional forms of physical activity such as aerobic and cultural dances are considered enjoyable and effective exercise options, especially by women (Murrock, 2010). Zumba fitness enhances cardiorespiratory fitness when target heart rates are reached (Luettgen, 2012).

c. Organize and participate in cooking classes to promote healthy food choices

- Organize cooking classes which feature healthy and affordable meals suitable for people with hypertension. Awards should be given to the top three participants, to be judged based on pre-identified criteria, such as taste and accessibility of ingredients, among others.
- Participating in cooking classes was effective in empowering individuals to create healthy meals for themselves and their families (Petty, 2023).

C. Health System

a. Provide an adequate supply of calibrated sphygmomanometers and anti-hypertensive medications

- All barangay health stations and rural health units must have calibrated sphygmomanometers that meet the WHO standard and an adequate supply of anti-hypertensive medications (Brady, 2020).

b. Build capacity of health staff through integrated care team training

- It should cover evidence-based protocols, clinical guidelines, forecasting medication supply needs, and staff engagement. Conduct refresher courses and provide engaging educational materials to health staff. Facility-level monitoring and mentorship should be done. Maintain strong referral linkages from the community to healthcare facilities.
- Using a team-based and task-sharing approach resulted in a mean reduction of systolic BP by 4.85 mmHg and a mean decrease in diastolic BP of 2.92 mmHg (Anand, 2019).

c. Conduct community-based screening for hypertension

- Conduct hypertension screening in areas with high foot traffic and set up “BP booths” during community events.

- Involve community volunteers and train them on the basics of hypertension, including the proper way of taking blood pressure readings. Establish a buddy system with volunteers and barangay health workers who can facilitate house visits for lost to follow-up patients.
- In a study in China, selected adults with previously undiagnosed hypertension underwent hypertension screening. Those who were found to have high BP readings were advised to seek care and adopt lifestyle modifications. Two years after this screening, reduced systolic blood pressure readings were noted. his strategy can thereby address cardiovascular diseases, particularly in countries that have a large unmet need for hypertension diagnosis and care (Chen, 2019).

d. Integrate hypertension services into established practices

- Utilize a multi-disease approach where hypertension, HIV, and other chronic conditions can be jointly evaluated and treated.
- Blood pressure control among hypertensives improved upon its integration with the HIV and chronic care model (Kwarisiima, 2019). Integrated TB and HIV care reduced both HIV and TB-associated morbidity and mortality (Uyei, 2014).

e. Conduct monitoring and evaluation of indicators for hypertension

- Establish a method for calculating indicators, examining trends, and maintaining feedback loops for quality improvement (Cazabon, 2022).

D. Local government unit (LGU) level

a. Improve the built environment to create safe and conducive spaces for physical exercise to manage risk factors for hypertension or enhance BP control

- Improve the built environment for safe physical exercise by providing well-ventilated, accessible, and spacious areas that can be utilized for physical activity such as community zumba classes.
- “Active parks” or low-impact outdoor exercise equipment have been installed in public parks worldwide (Lee, 2018), which is used and perceived positively. These are utilized not only for fitness activities but also for rehabilitation and play (Stride, 2017).

b. Conduct capacity-building among stakeholders on hypertension prevention and control

- Discuss adverse implications of poor BP control, barriers to BP control, and the potential for implementation strategies to improve BP control through interactive workshops. Learning modules should also be available online.

- Educating patients and their carers, along with other strategies, resulted in an estimated population rate of BP control increase from 30% to 58% (Gonzales, 2020).

c. Require food establishments to display nutrition information of food items

- Display caloric information on food and beverage products in menus of food establishments.
- Certifications must be awarded to establishments that serve healthy food options. Specific dishes may also be tagged as "Heart-friendly" to motivate and help individuals to make healthier food choices.
- Saudi Arabia's Health ood Strategy was successful in reducing trans fatty acids and sodium content of some products, along with the increased sales of low-calorie meals in food establishments. Its components include displaying nutrition information in food menus of establishments, adoption of front of pack nutrition labels on food products, banning the use of partially hydrogenated oils and reducing sodium composition in selected food products. The importance of educational campaigns and of changing the consumers' and stakeholders' knowledge, attitude and behavior towards food was also emphasized in this study (Bin Sunaid, 2021).

CASE STU Y: Community drug distribution at doorsteps: Essential health services decentralized to care for hypertensives under the IHCI initiative World Health Organization, 2020

Vital Strategies launched the India Hypertension Control Initiative (IHCI) in 2017, which utilized evidence-based strategies to strengthen hypertension management and control. As of 2020, this initiative has been implemented in 31 districts in six states in the country, with the goal of reaching up to 100 districts nationwide.

IHCI decentralized routine services such as blood pressure monitoring and drug refills at the Health and Wellness Centers (HWCs) to improve patient-centric care and treatment adherence. A team consisting of frontline health workers was created to mobilize drugs for distribution to patients and coordination was done with the district and state governments to ensure adequate medication supply. All frontline health workers were provided hands-on training on blood pressure monitoring and drug refills. High-risk patients were advised to seek care through teleconsultation or where referred to the PHC. According to the Senior Medical Officer of Punjab, "*We have delivered medicines to almost 1350 Hypertensives in the last month in our block through HWCs and community distribution during the lockdown. HWCs were operational throughout the week considering the need for people,*".

LONG VERSION

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To improve patient-centric care, maintain the continuum of care, and treatment adherence, IHCI decentralized routine services such as blood pressure monitoring and drug refills at the Health and Wellness Centers (HWCs). The initiative, also coined as the doorstep delivery strategy, was timely and relevant during the peak of the COVID-19 pandemic, which resulted in improved patient follow-ups at HWCs and better medication compliance despite the lockdown. A team consisting of frontline health workers was created to mobilize drugs for distribution to patients, which was provided to them at an extended duration. The estimation of the necessary quantity of medications required was done by cardiovascular health officers (CVHOs), who also coordinated with the district and state governments to ensure adequate medication supply. It was noted that 52% of total registered patients under IHCI received antihypertensive drugs through community distribution at their doorsteps, during April and May 2020.

All frontline health workers were provided hands-on training on blood pressure monitoring and drug refills. High-risk patients were advised to seek care through teleconsultation or where referred to the PHC. Monitoring of drug distribution and consumption and verification of drug refills through phone calls were also facilitated. According to the Senior Medical Officer of Punjab, "*We have delivered medicines to almost 1350 Hypertensives in the last month in our block through HWCs and community distribution during the lockdown. HWCs were operational throughout the week considering the need for people,*".

QUOTE:

- *"Isa rin po yung mga programang pampalakasan o 'yung pang exercise. Dahil ako po napapansin ko, 'pag ako ay nasa kasalinang, ako [ay] nagbi-BP pagkauwi. Ang nababa po, nagnonormal po ang aking BP…120/80. 'Pag kasi napagod, naeexercise pala…nababa ang BP. Nagwa-120/80 ako, pero kung malimit lang…140/90. Pero pag di nag[exercise], mataas [ang BP]."* (Exercise is also one. I notice that when I get tired because of exercising, my blood pressure becomes normal at 120/80, when usually, it's at 140/90 mmHg.)
- *"Umiwas sa pagkain ng mga matataba at maalat na pagkain para di ma-high blood" (Avoid eating fatty and salty food so your blood pressure won't increase.)*
- *"Kung minsan po ay naabusuan ng gamot sa [health] center. 'Yan po ay natitigil. Kasi po natigil ang pag-inom ng gamot, lalo na sa hypertension, talagang nag…nagshoot up (o tumataas) ang mga BP." (Sometimes, anti-hypertensive medication is not available at the health center. When you discontinue taking medication, your blood pressure shoots up.)*

Respiratory diseases

A. Individual & household level

a. Avoid burning garbage / open burning / *pagsiga* to prevent asthma exacerbation and lung cancer

- Burning plastics can result in the release of toxins that are harmful to the body, and can worsen asthma and even contribute to the development of lung cancer (Manisalidis, 2020).

b. Boost the immune system to the lessen the risk of acquiring respiratory diseases

- Be physically active, eat a well-balanced diet, avoid overfatigue, stress, and smoking, and limit alcohol intake (Harvard Health Publishing, 2021).
- Those who exercise regularly are less likely to have respiratory illnesses, while those who get infected have a shorter illness duration with milder symptoms and less risk of dying from pneumonia and influenza (Laddu, 2020).

c. Be vaccinated against respiratory pathogens

- Be vaccinated against influenza, pneumococcal pneumonia, tuberculosis (BCG vaccine) and other vaccine-preventable respiratory diseases.
- Being vaccinated against Influenza is the single best way to reduce its risk and complications (CDC, 2023).

d. Observe cough etiquette and respiratory hygiene

- Cover your mouth and nose with tissue or the sleeve of your shirt when coughing or sneezing. Dispose used tissue and wash hands right away. Clean frequently touched surfaces with soap and water or alcohol.
- Avoid close contact with people who have symptoms (sneezing, coughing, congestion, and/or fever). This is considered the best method for preventing the transmission of respiratory diseases (CDC, 2018).

e. Seek medical consult to prevent or manage respiratory conditions

- Immediately seek medical assistance when symptoms of respiratory diseases such as coughing, difficulty of breathing, shortness of breath, and chest tightness, arise.
- In 2015, pneumonia was one of the leading killers of children below 5 years old. In 2020, it was the fifth leading cause of death in the Philippines (PSA, 2021). Majority of these deaths are readily preventable or treatable with proven cost-effective interventions, hence, early identification of symptoms and treatment must be prioritized (Kallander, 2016).

B. Community/Barangay

a. Conduct workshops on cough etiquette and respiratory hygiene

- Conduct interactive sessions on common respiratory diseases, their symptoms, and prevention measures (cough etiquette and respiratory hygiene) among organized groups such as the association of fisherfolks or farmers. Distribute easy-to-read flyers which they can share with other members of their household.
- The use of a multi-component intervention, where information, motivation, and behavioral skills were acquired through group education, action planning, guided action, and feedback, led to an increase in the level of knowledge, self-efficacy, self-reported engagement, and the quality of respiratory infection preventive behaviors among older adults in a community dwelling (Lee, 2021).

b. Engage local champions to help raise awareness on respiratory conditions

- Mobilize barangay health workers and volunteers who can serve as local champions to help provide accurate information on preventing, recognizing, and seeking medical help for respiratory conditions. These local champions can conduct a brief talk during community meetings and distribute flyers during community events.
- Community engagement approaches are effective in supporting contextualized, acceptable, and appropriate prevention and control of infectious diseases (Gilmore, 2020).

C. Health System

a. Conduct "chest camps" to providing free chest x-ray and consultation in communities and workplaces

- Establish partnerships with service providers or non-government organizations to facilitate free chest x-rays and consultations to facilitate screening of respiratory conditions.
- Screening for TB using workplace-based screening and occupational health clinics, coupled with training and community engagement, have been effective for early diagnosis and treatment for miners, resulting in improved health outcomes (Moyo, 2024).

b. Mobilize local community volunteers who can serve as the link between the community and healthcare facilities for respiratory conditions

- Community volunteers can do house-to-house visits and refer patients to healthcare facilities when indicated. They can also help spread awareness by conducting health education during these visits.
- Kalinga Health, a 360-degree facility providing quality and affordable comprehensive TB care in two cities in the Philippines, engaged community volunteers who refer community members to the said health

facility and cascade relevant health teachings that have increased the community's awareness (Tiangco, in prep).

c. Integrate respiratory initiatives into health programs such as HIV infection and maternal and child health

- Discuss about respiratory diseases, their symptoms, and preventive measures to raise awareness on when to seek care. During maternal consultations, encourage all pregnant women to be screened for TB symptoms and to watch out for symptoms of other respiratory conditions.
- In a study in Eswatini (Southern Africa), B/HIV services were integrated in Reproductive Maternal Newborn and Child Health settings through enhanced monitoring tools and on-site technical support (cough monitors and peer mentor mothers on TB screening and monitoring). With these, TB screening coverage was high, diagnostic evaluation and identification of TB cases was low, and there was moderate uptake of tuberculosis preventive treatment (TPT), albeit with poor completion rates. Healthcare providers were supportive of integrated services but felt that additional resources were needed to effectively implement these services (Hartsough, 2022).

D. Local government unit (LGU) level

a. Strictly enforce smoke-free environment policies

- Smoking is restricted in all indoor work and public places, public transport, shops, indoor arenas, and restaurants, while commercial aircraft, shared ground transportation, universities, schools, healthcare facilities, residential public areas, and private offices are 100% smoke-free.
- emove ashtrays from smoke-free areas, frame education messages around the health benefits of the policy for workers, focus the enforcement on venue managers rather than individual violators and allow the public to report violations (WHO, 2007). Form a smoke-free task force to ensure policy implementation and monitoring.
- Smoke-free policies can benefit health, particularly cardiovascular and respiratory systems, and support for these policies is high, especially in places frequented by children (Boderie, 2023).

b. Improve air quality to prevent development or exacerbation of respiratory conditions

- Observe healthy and code-compliant indoor air quality in all establishments.
- Strengthen air quality monitoring to evaluate pollution, air-borne allergens, aerosolized pathogens, and dust burdens to allow modeling of future health impacts, which can lower the emission of pollutants that contribute

to respiratory and cardiovascular problems (National Institute of Environmental Health Sciences, 2022).
- Opt for renewable sources of energy (e.g. solar) and design low-carbon transport modalities (National Institute of Environmental Health Sciences, 2022).

c. Ensure regular waste collection in all barangays
- Facilitate regular collection of wastes to eliminate open-waste burning (OWB) among residents.
- High levels of exposure to toxins from OWB can cause respiratory and cardiovascular diseases, leading to cancer and adverse birth defects (Das, 2018).

CASE: Kalinga Health: A Hub-and-Spoke Social Enterprise Model in Engaging the Private Sector for Improved Tuberculosis Care
Tiangco & Mier-Alpaño, in prep

Kalinga Health, established by Innovations for Community Health (ICH), is a 360-degree facility providing quality and affordable comprehensive tuberculosis (TB) care in the Philippines. A thorough examination of the pain points of both TB patients and their private providers has motivated ICH to work towards improving TB screening, detection, and treatment, guided by a grassroots approach that offers social protection among vulnerable populations.

Kalinga Health utilizes a hub-and-spoke social enterprise model, acting as the “hub” where a network of private providers (“spokes”) refer patients through a variety of public-private mix (PPM) strategies. It essentially acts as an intermediary facility between the public National TB Control Program (NTP) and the network of private providers. Another essential component of this initiative is their engagement of K! Leaders, who are community volunteers trained to conduct house visits for patients who fail to follow up on their scheduled appointments and encourage and refer individuals who have risk factors for or present with symptoms of TB to the clinic. As lay health workers, they were able to encourage community members to seek help in the facility and have cascaded relevant health teachings that have increased the community’s awareness.

From April 2019 to February 2023, Kalinga Health has initiated treatment for 1,610 individuals, has prevented 16,100 individuals from contracting TB and has saved Php 6,440,000.

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motivated ICH to work towards improving TB screening, detection, and treatment, guided by a grassroots approach that offers social protection among vulnerable populations. Acknowledging the various key actors necessary for crafting a human-centered solution, their operations have been geared towards reforming health markets and health systems through innovation, delivery of high-impact interventions, and the provision of sustainable community health and quality health services at scale.

Kalinga Health utilizes a hub-and-spoke social enterprise model, acting as the “hub” where a network of private providers (“spokes”) refer patients through a variety of public-private mix (PPM) strategies. These private providers, also known as stand-alone physicians (SAPs), have partnered with ICH and have access to Kalinga Health’s diagnostics and treatment services. Kalinga Health essentially acts as an intermediary facility between the public National TB Control Program (NTP) and the network of private providers. he N P supplies Kalinga Health Hub with GeneXpert cartridges and first-line TB medications, while Kalinga Health offers their services to private providers. Medical engagement executives (MEEs) are trained to do capacity and relationship building with S Ps to promote increased uptake of services. Additionally, the Hub acts as a one-stop facility for case registration, reimbursement of public and private health insurance, and treatment support for referral partners in the private sector.

An essential component of this initiative is their engagement of K! Leaders, who are community volunteers initially engaged for an ICH initiative promoting cardiovascular health for primary health care. They underwent a series of training sessions and were in charge of taking the blood pressure readings of at-risk community members. Eventually, they were also involved in Kalinga Health, where they were trained and tasked to conduct house visits for patients who fail to follow up on their scheduled appointments and encourage and refer individuals who have risk factors for or present with symptoms of TB to the clinic. As lay health workers, they were able to encourage community members to seek help in the facility and have cascaded relevant health teachings that have increased the community’s awareness. They are perceived to be more relatable, being one’s neighbor or friend. This familiarity enables the establishment of rapport and trust, making them more receptive to the information provided to them. K! Leaders are unified in sharing that being one has helped not only the community members, but also themselves, increasing their self-confidence, health knowledge, and social networks.

From April 2019 to February 2023, Kalinga Health has initiated treatment for 1,610 individuals, has prevented 16,100 individuals from contracting TB, assuming that 1 untreated TB patient can infect 10 more individuals, and has saved Php 6,440,000, assuming that the total cost of TB treatment is equal to the total PhilHealth case rate for an outpatient TB case amounting to Php 4,000.

QUOTE:

"Local government pero pwedeng i-adopt sa household po yung health education na rin. Involvement po ng parents as activity ng government para po sa [...] ma-educate sila."

*(*Health education can also be facilitated at the household level. The involvement of parents in these government-initiated activities is important to help educate them.)
*"Kasi kahit anong gawin ng LGU, 'pag hindi participative si community or si household, hindi po mago-go yung yung project." (*Because no matter what the LGU does, if the community or households are not participative, the project will not be successful.)

Heat-related illnesses

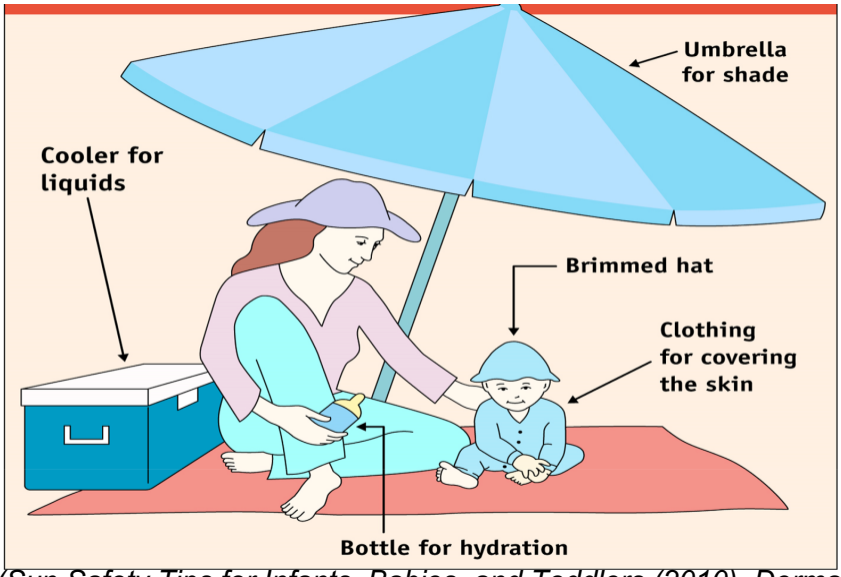
A. Individual & household level

a. Adopt a healthy lifestyle

- Eat healthy, exercise regularly, limit alcohol intake, avoid cigarette smoking, get enough sleep, and maintain a healthy weight.
- Older adults and those who have compromised cardiovascular health are more likely to suffer from heat-related diseases (Cheng et al., 2019; Bunker et al., 2016).

b. Observe sun-safe behaviors

- Stay hydrated, seek shade, avoid direct sunlight, wear long-sleeved clothes, use an umbrella and sunglasses
- Wearing sunglasses protects against ultraviolet rays and reduces the risk of cataracts (Kuo, 2019), but will be more effective in preventing other heat-related illnesses when supplemented with other sun-safe behaviors (Backes, 2019).



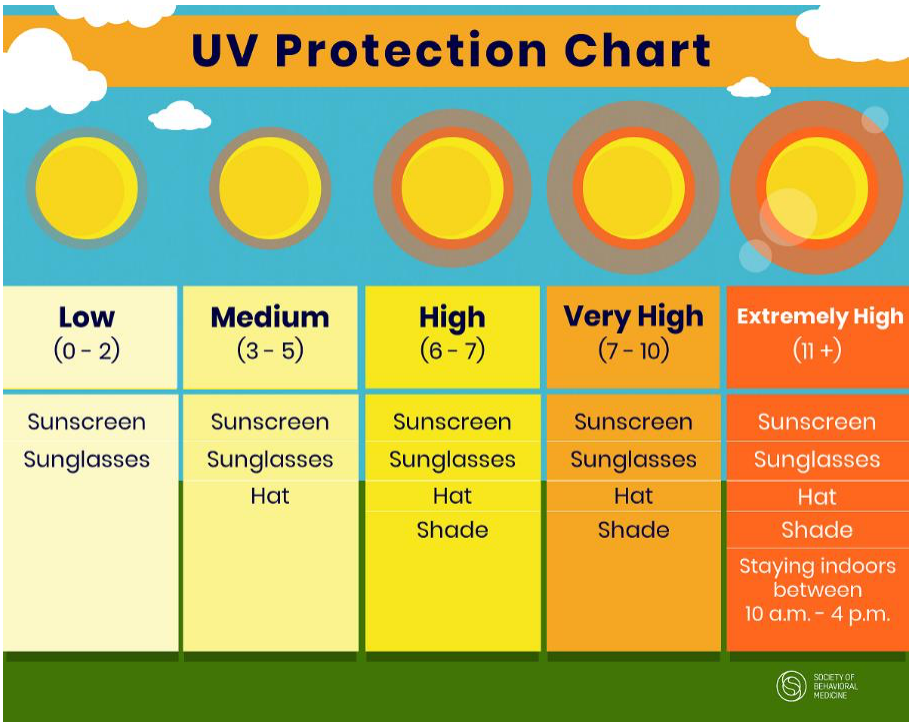
(Sun Safety Tips for Infants, Babies, and Toddlers.(2010). Dermatology Nursing,38-39 & Wellparks Student Center)

c. Plan the timing of one's outdoor activities

- Check extreme heat alerts and plan activities accordingly. Avoid going out during the hottest periods of the day, as the participants shared,

"Maagang maaga kami nagsisimula para hindi pa tirik ang araw at hindi pa gaanong mainit."

- Start activities slowly and pick up the pace gradually to prevent overfatigue and heat stress.
- Know when to seek medical help and to immediately get help when symptoms arise (CDC, 2023).



UV Protection Chart (Society of Behavioral Medicine)

d. Use low-cost solutions to minimize heat in homes

- ecycle discarded plastic packaging into sheets and insulation boards. These provide shading, reflect solar radiation, and insulate dwellings from the heat.
- Grow potted plants and creepers on the roof, which can reduce the temperature by 2.5 ℃.
- Paint roofs and sun-facing walls with solar-reflective paint, which can reduce indoor temperatures by 4-5℃.
- Fill used plastic bottles with water and secure them on the roof. These absorb the heat from the sun and increase the roof's ability to absorb, store, and release heat. By night, the water cools down, and the process restarts.

Plastic bottles filled with water which absorbs the sun's heat, keeping the building cool for longer (Image: cBalance)

e. Undergo general health check-ups to control diseases exacerbated by heat

- Undergo semi-annual general health check-ups to ensure that good health is maintained and chronic conditions are controlled.

B. Community/Barangay

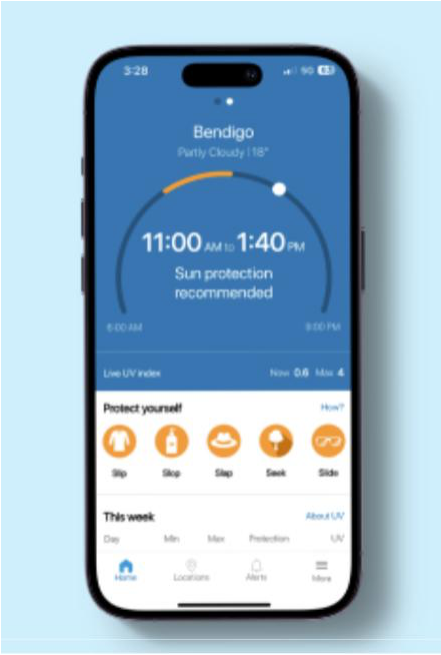
a. Set up cool spaces using local materials with the help of partnerships and networks.

- Work with cooperatives (women's, farmers, etc.), the local government unit, and other stakeholders to finance and sustain these projects.
- Use mud and bamboo alongside manmade materials, install openings for cross-ventilation, and create insulation from coconut fiber and glass windows (Heringer, n.d.).

b. Increase community awareness through workshops on how to protect themselves from the heat.

- Facilitate informative workshops on climate change and its effects. Conduct workshops on affordable cooling techniques for homes.
- Implement a multi-component and community-wide skin cancer prevention program, which can help save billions of pesos in treatment costs (Guy et al., 2015). This program includes mass media campaigns,

school programs, sports programs, health care provider education, resource development and dissemination and building capacity for prevention at the community level. Learning resources for students, workers, and health professionals are easily accessible online. A mobile application and widget were also developed to determine the UV level based on the person's location and provide information on how to protect oneself (SunSmart, 2024).



The SunSmart Global UV app that allows users to check the UV level in their current location (SunSmart, 2024). The application can be downloaded from the App Store or Play Store.

C. Health system

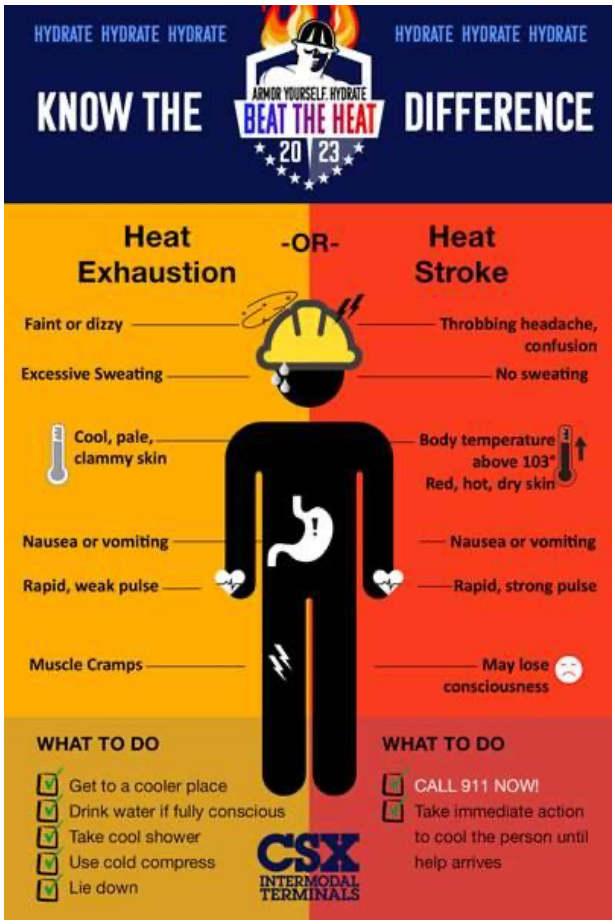
a. Identify and inform populations vulnerable to the effects of extreme heat

- During consultations or house-to-house visits, identify individuals with pre-existing health concerns and increased exposure to hazards and educate them on what to do to decrease the risk of heat-related illnesses. These information can also be shared while patients wait for their turn to be served in health facilities.
- Additional economic (e.g. free sunscreen) or environmental (e.g. adding shaded areas at school) interventions were more likely to encourage school children to adopt sun-safe behaviors (Baig, 2023).

b. Information dissemination on sun-safe behaviors

- Distribute useful culture-sensitive and context-specific learning materials (fans and calendars) promoting sun-safe behaviors. Social media posts may also be utilized to reach a wider audience, especially the youth.

- Crane et al. (2012) found changes in behavioral outcomes (use of protective clothing and midday sun avoidance) and increased awareness of skin cancer risk after sending newsletters on sun protection and skin cancer to parents and their children over three years.
- An increase in sun protection behaviors was noted among children after being provided with read-along books and swim shirts. This also resulted in a smaller skin pigmentation change among those who were receiving the intervention (Ho, 2016).
- A 2010 heat prevention campaign in California, which utilized a social marketing strategy, significantly increased the awareness of workers on heat illness prevention. They found the materials provided useful and relevant to the work they do. Statistically significant behavioral changes, such as drinking water more frequently, resting in the shade, and communicating with their employers on heat prevention, were also noted (Teran, 2010).



Handout cards for distribution by managers to service workers in break rooms and common areas (CSX Intermodal Terminals, 2023)

D. Local government unit (LGU) level

a. Integrate Sun-safe Behaviors into Policies and Training

- Educate outdoor workers, such as farmers and fisherfolks, about the risks of exposure to UV rays, the symptoms of overexposure, preventive actions, and first aid. These guidelines must also be included in workplace wellness programs to help protect workers from heat-related illnesses.
- Tailored and context-specific workplace education has been shown to improve workers' sun protection behaviors (Haynes, 2018).
- In the State of California, the law requires all employers to provide workers with fresh water, access to shade, and cool-down breaks in addition to regular breaks. Training on the signs of heat-related illnesses and what to do in case of an emergency are also provided. Heat illness prevention plans which include emergency response procedures must also be put into writing and effectively implemented (Department of Industrial Relations, 2021).
- In the same state, an Extreme Heat Action Plan has been developed to help communities adapt to the extreme heat and promote resilience. It aims to accomplish this through 1) building public awareness and notification (e.g. make information easily accessible to build knowledge on the prevention and treatment of heat-related illnesses), 2) strengthening community services and response (e.g. implement heat prevention standards for indoor and outdoor workers), 3) increasing resilience of the built environment (e.g. use cooling technologies), and 4) utilizing nature-based solutions (e.g. provide strategic shade and regulate temperatures of building/structures). (Governor's Office of Planning & esearch, 2022)

b. Organize tree nurturing activities

- Address the most important drivers of forest loss and degradation (e.g. illegal logging). Allowing trees to regenerate naturally is the most cost-effective way to increase tree cover, with less reliance on costly and labor-intensive methods (Chazdon, Lindenmayer, et al., 2020). This can be facilitated through site protection by fencing, weeding competitive ferns, and controlling climbers (Holl & Aide, 2011).
- As a supplement to allowing trees to regenerate naturally, planting trees can be done to lessen community heat-related illnesses (Iungman et al., 2023; Kalkstein et al., 2022). The acceptability of this strategy in Alabat is high, as one participant shared, "*Pag tirik ang araw, sa ilalim ng puno kami namamahinga.*" (When the sun is at its highest point, we stay and rest under the shade of trees.)

c. Enact tree and landscape ordinances

- The ordinance must involve an assessment of the natural resource conservation in the area and a management strategy that aims to protect trees and provide shade.

- Important elements include establishing maximum tree cover and maintaining street trees appropriately to maximize public benefits while minimizing hazards and maintenance costs (Bardon, 2019).

d. Promote and maintain green spaces

- Build and maintain community gardens, multi-purpose community spaces, and parks with walking or biking lanes.
- Green spaces are 7°C cooler than less vegetated surrounding areas, with their cooling impact extending beyond their physical boundaries (Zhang et al., 2017). Engaging the community by including them during planning, implementation, and monitoring of the project's impact makes it more effective and sustainable (Cleary, 2017).
- A meta-analysis by Rojas-Rueda (2019) determined that the more vegetation or green spaces there are in an area, the less risk people have of dying, making it an important public health intervention.

e. Install or apply cool roof coating

- Use light-colored paint for the roof, as it reflects light and therefore absorbs less solar energy. The temperature on the roof, inside the building, and in the surrounding ambient air is thereby reduced.
- Encourage the use of cool roof coating by offering loans to partially cover installation costs. Financial incentives from the reduction in facility energy use may also be provided.
- In a UK study, the use of cool roofs resulted in an 18% decrease in heat-related mortality associated with the heat island effect (Macyntire, 2019). In India, more than 7,000 low-income households' roofs have been painted white, saving approximately 1,100 lives annually (Ashden Climate Solutions in Action, 2020).

CASE STU Y: Tackling Extreme Heat in Southeast Asia

Taylor, 2021

Mahila Housing Trust (MHT) is an Indian not-for-profit organization working among 10 cities in India to help build resilient communities. Information campaigns on climate change, including affordable and easily implementable strategies to cool homes, has benefited 1,600 women and 200 households to date.

Passive cooling methods such as coating roofs and sun-facing walls with solar-reflective paint and growing potted plots and creepers on roofs, were introduced to prevent heat from building up in homes. The former caused 80% of heat energy to be reflected, thereby reducing indoor temperatures by 4-5℃ (Global Cool Cities Alliance), while the latter reduced indoor temperatures by 2.5℃ through its provision of shade and evapotranspiration. MHT also assists with roof renovations, where structures are rebuilt with recycled materials and have vents to let more light in without trapping heat, leading to a 6-7℃ reduction in temperature. MHT also

educates women on the principles involved in reducing heat stress, such as considering the building's orientation during construction. Doing so emphasizes the impact of the simple and economical heat reduction strategies that have been tailored to their context.

Long Version

Mahila Housing Trust (MHT) is an Indian not-for-profit organization based in Ahmedabad, Gujarat, working among 10 cities in India to help build resilient communities. Information campaigns on climate change, including affordable and easily implementable strategies to cool homes, has benefited 1,600 women to date.

Passive cooling methods, which prevent heat from building up in homes, have been central to the strategy. One of the techniques utilized involves coating roofs and sun-facing walls with solar-reflective paint, causing 80% of its energy to be reflected, thereby reducing indoor temperatures by 4-5℃ (Global Cool Cities Alliance). Growing potted plants and creepers on roofs, which can reduce indoor temperatures by 2.5℃ through its provision of shade and evapotranspiration, was also introduced. To date, it has benefitted approximately 200 houses in two cities in India. MHT also assists with roof renovations, where structures are rebuilt with recycled materials and have vents to let more light in without trapping heat, leading to a 6-7℃ reduction in temperature.

Apart from these, MHT also educates women on the principles involved in reducing heat stress, such as considering the building's orientation during construction. Doing so emphasizes the impact of the simple and economical heat reduction strategies that have been tailored to their context.

Reference: Taylor, N. 2021. 5 sustainable solutions to help tackle extreme heat in South Asia. Retrieved Jan 12, 2024 from https://www.thethirdpole.net/en/climate/5-sustainable-cooling-solutions-tackle-extreme-heat-south-asia-2/

QUOTE:
"Nakakaranas tayo ng init, tuwing lalabas lang. Iniiwasan na lang ang init." (It's too hot when we go out. So we just avoid doing so.)
"Napunta ako doon [sa bundok] mga alas sais. Para hindi pa gaanong mainit. Nagsusuot din ako ng long sleeves at ng sombrero." (I go to the mountains at around 6 in the morning. I also wear long sleeves and a hat.)

Water-borne diseases

A. Individual level

a. Handwashing habits

- Handwashing, especially during food preparation and before eating, is essential for maintaining good health and preventing disease transfer

among households. Specifically, it can also prevent illness caused by viruses or bacteria (Mihalache et al., 2023). Hence, households must practice handwashing techniques with proper hand hygiene products, soap, or rubbing alcohol.

b. Basic Toilet Facilities for Every Household
    - Encourage the DOH's Zero Open Defecation Program, which strives to obtain 100% complete toiletries to end open defecation and guarantee that the UHC Law is followed (Luczon, 2023; UNICEF, 2022). Therefore, in addition to implementing hygienic practices, every household should be urged to build and care for the cleanliness of their toilet facilities.

B. Community/Barangay

a. Regular clean-up drive initiatives
- Continuous clean-up campaigns in barangays are required to prevent waterborne illnesses. These efforts aid in the removal of potentially infectious waste. They also teach everyone, particularly children, the value of cleanliness and environmental stewardship.
- Ensure that Barangay Cleanliness Day or *BarKaDa* is properly implemented such as dredging clogged waterways, initiating coastal clean-ups, and dismantling the potential breeding grounds of mosquitoes (Chavez, 2023). This will also prevent bacteria and other viruses from harboring in the public places.

C. Health system

a. Capacity building for Water Quality Management
- Healthcare workers and water treatment operators can all benefit from training and capacity-building programs. The cost-effectiveness of water quality monitoring should be improved through integrating risk-based water management systems. Efforts to increase monitoring capacity should prioritize program sustainability and public dedication to water safety (Peletz et al., 2016).

b. Periodic physicochemical and microbial analyses in water supplies
- Periodic water analysis is vital in assuring the quality and safety of the water supply in the community. Mainly, it can provide crucial information such as levels of chemicals, minerals, and microorganisms in water, which may pose a risk to human health if consumed excessively (Kiron et al., 2022). It also helps identify potential problems in the water supply system, including issues with the water treatment and distribution system or contamination from external sources. By identifying these problems, the local government must create measures to address them before they become a significant health hazard. Lastly, periodic water analysis can provide valuable information, resulting in cost savings and increased service efficiency (Aghaei et al., 2017).

D. Municipal level

a. **Policy Development for Water Treatment Facilities in the Municipality**
    - Policy development for water treatment facilities within the municipality is highly encouraged as an initial step to prevent waterborne diseases. The available water regulations and the Water Safety Plan of the municipality must agree in terms of defining the water supply system and implementing monitoring and controls (Baum et al., 2015).
b. **Cultivation of enabling environment for water treatment facilities in all barangays**
    - Organizational culture in implementing a water safety plan fosters the cultivation of safety culture and empowers staff to take ownership of their responsibilities (Omar et al., 2017).
    - The local government can introduce initiatives and policies that stimulate the establishment of additional water refilling stations in every barangay. They may also provide subsidies or tax incentives to water refilling stations that adhere to health and safety regulations. Moreover, the local government may seek partnerships with external organizations or institutions to fund the provision of additional water refilling stations (Herschan et al., 2020).

CASE STUDY BOX:

Dasmariñas Water District (DWD) is the third largest water district in the Philippines, serving 110,000 connections. It has established 144 public water stands in informal settlements where the district's poorest dwell, serving a population of approximately 17,000. In 2009, DWD created a water safety plan (WSP) to ensure safe water for all, without discrimination. One of the initial objectives in water safety planning is to "walk the system" and define water supply components from catchment for usage, such as source, treatment, distribution, storage, and behavior among users. The team found an imbalanced user burden and a greater likelihood of contamination. People in informal settlements have been using unsafe pipe materials from the meter to the tap because they lack the needed resources to purchase adequate material. The survey results encouraged W to consider a more equal distribution plan, such as providing a twelve-month guarantee on repairs to encourage households to use the service. In addition, DWD observed the perceptions of poor water quality and increasing costs for households with low incomes. Thus, the W -WSP team decided to begin a water testing and communication program in the informal settlements to determine and communicate water quality to the users and allow for more informed decision-making. There was also evidence of water infrastructure degradation in the informal settlement. As a result, the team created risk-reduction strategies such as more effective tap stand designs.
Source: World Health Organization Team. A Guide to Equitable Water Safety Planning: Ensuring No One Is Left Behind, World Health Organization, 2019, pp. 60–62.

QUOTES:

- "*Nakuha na po sa refilling station, ma'am. Wala naman [nagkakasakit sa tiyan o nagtatae].*" **"We get our drinking water from the refilling station, ma'am. So far, no one is getting a stomach ache or diarrhea."** *(BHW)*
- *"Noong maliliit pa ang aking mga anak ay nagpapakulo po ako ng tubig noon. Pero nung malaki-laki na po sila, minsan nakakainom sa gripo, kaya nagkakasakit na sila."* **"When my children were still smaller, I used to boil tap water for drinking. When they grew up, sometimes they drink from the tap water, and eventually get sick."** *(BHW)*

Dengue

A. Individual and household levels
    a. **Observe 4S in households**
        - Observing the 4S Strategy from the Department of Health is crucial in every household for dengue prevention. he strategy comprises Ssearching and destroying mosquito breeding sites (dirty, stagnant water), Ssecuring self-protection, Sseeking early consultation, and Ssupporting fogging/spraying. When implemented in every household, the success of dengue control and prevention starts within the confines of every household (Lambatin, 2019).
        - When symptoms of dengue fever emerge such as high-grade fever, muscle pain, etc, it is crucial to seek medical attention as soon as possible. If left untreated, dengue fever is a mosquito-borne infection that can lead to severe complications. Early detection and appropriate treatments can increase chances the possibilities of complete recovery and prevent developing severe dengue (Rufo & Amparado, 2017).
    b. **Use of insect repellents and long clothing**
        - Using insect repellents and wearing long clothing are essential measures to prevent insect bites and reduce the risk of infection from dengue fever. Insect repellents containing citronella, DEET, picaridin, or oil of lemon eucalyptus are effective in repelling mosquitoes and other insects. Wearing long-sleeved shirts and pants is also recommended, especially when dengue-carrying mosquitoes are most active in the two hours after sunrise or late afternoon (Hasler et al., 2019;).
B. Community/Barangay
    a. **Regular ~~Continuous~~ clean-up drives**
        - Community members must continuously take part in barangay-level clean-up drives. This initiativeact not only instills a sense of responsibility and ownership but also increases awareness on regarding dengue prevention. It also teaches communities the need to keep the environment clean to prevent the spread of dengue (Lambatin, 2019).
C. Health System
    a. **Conduct Dengue Resource and Trainings on Dengue**

- Healthcare personnel can be given resources and training to expand their expertise and skills in diagnosing, treating, and managing dengue. This consists of training in clinical case management, laboratory testing, and vector control measures with continuous supervision (Nikookar et al., 2023).

D. Municipal/Local government unit (LGU) level

a. Lead the organization and collaboration of every stakeholder to clean their surroundings

- The local government is vital in mobilizing the community to create cleaning activities for dengue prevention in the municipality. Through campaigns and initiatives, the government can boost awareness about maintaining a clean and hygienic environment to prevent dengue cases. They can engage with every barangay to educate them about the breeding grounds of mosquitoes and how to eliminate them (Espino et al., 2004).

CASE STUDY BOX: Teaching Dengue Prevention Through Effective Storytelling in Public Schools

A study conducted by Judilyn N. Solidum and Gilmore G. Solidum found that storytelling is a successful way to teach and learn Dengue principles and prevention concepts at the elementary and preschool levels in the Philippines. The study implemented a one-group pre-test and post-test experimental design, with three original storybooks serving as teaching-learning materials. The stories used in the study were “Moskee, Ang Bampirang Lamok”, “Dinudugo si ino”, and “Huwag MOKONG Kagatin, Kwento ng Batang Na-Dengue”. The results revealed an exceedingly statistically significant difference between the subjects' mean pre- and post-test results. Respondent students reported that the sessions were enjoyable, interesting, and interactive. They understood the principles through story events and characters, and the entire experience enhanced memory recall. Faculty members reported that the storytelling-based teaching-learning technique proved highly educational, with science and health notions well interwoven in the stories.

Source: Solidum, J N, and G G Solidum. “Storytelling as a Health Teaching Strategy for Dengue Prevention and Control in the Philippines.” Philippine Journal of Science, vol. 144, no. 1, June 2015, pp. 61–67, doi:https://philjournalsci.dost.gov.ph/images/pdf/pjs_pdf/vol144no1/pdf/storytelling_as_a_health_teaching_strategy_for_dengue_prevention.pdf.

QUOTE:

- *“Doon po sa Dengue, ang mga basyo may tubig…minsan nagkakatubig, napapamahayan. Meron naman po kami dito, may time na sila nagsspray (o defogging). Nagsspray ng mga vector.”* **“As for Dengue, the empty water containers, sometimes**

water gets in and then mosquitoes live inside. We have Dengue prevention measures here. Sometimes they do spraying or defogging. Spraying to the vectors."

Malnutrition

A. Individual and household levels

a. Home Gardening

- Home gardening is a great approach to combat malnutrition by supplying homes with healthy and nutritious food. Growing fruits, vegetables, and herbs in one's garden enables access to various nutritious items that enhance a person's nutrition (Depenbusch et al., 2022). urthermore, home gardening is a low-cost strategy to increase nutrition because it minimizes the need for costly store-bought produce (Langellotto, 2014). Overall, home gardening is an essential strategy in the battle against malnutrition since it provides people with a consistent source of nutritious food.

B. Community/Barangay level

a. Empower and support Barangay Nutrition Scholars

- Barangays are highly recommended to collaborate with non-governmental organizations (NGOs) that provide free training catering BNS and BHW. The collaboration between LGUs and NGOs can assist BHW and BNS programs in developing the capacity to efficiently identify and creatively respond to local community needs. It also helps establish successful approaches to recruiting, training, and retaining CHWs. Lastly, it creates monitoring programs informed by both communities and public health systems (Naimoli et al., 2015).

b. Find ways to compensate for food and other expenses BNS needs. May the time and efforts in volunteerism be compensated enough to increase their motivation and ensure sustainability in eventually combatting malnutrition in their respective communities.

- The Provincial Government of Iloilo held a cooking contest for the 2023 Nutrition Month, featuring indigenous recipes from different Indigenous Peoples' (IP) Groups. The contest highlighted the cultural and nutritional balue of the (Herrera, 2023). Doing such project may encourage the community members, especially the younger generations, that you can eat delicious food while achieving their nutritional needs at a lower to zero cost (if the community food garden is also created), while preserving the heirloom recipes.

C. Health System

a. Nutrition education for parents and children

- Nutrition education is critical to improving children's health, and parents have the most influence over their children's eating habits. Parents may make well-informed decisions about what to feed their children when they understand the value of a balanced diet and the impact of unhealthy food choices on their child's health. Parents can learn how to cook nutritious

meals for their children and motivate them to create healthier food choices if they acquire nutrition education. This endeavor can result in excellent nutrition, a lesser risk of chronic diseases, and better health outcomes. As a result, local governments must strengthen their initiatives in nutrition education catered to parents and children to improve their health and well-being (Watson et al., 2023).

D. Local government unit (LGU) level

a. **Sustainable feeding program in schools**
   - A sustainable school feeding program can significantly affect children's well-being and overall health. It may ensure that students obtain the essential nutrients for their growth and development. A sustainable feeding program can also foster healthy eating habits and lower the prevalence of obesity and other diet-related conditions.

b. **Provide livelihood programs to parents of malnourished children**
   - Livelihood programs may help mitigate malnutrition by providing families with the resources they require for accessing nutritious food. Parents who have limited access to better job opportunities must have access to quality skill training from the government that is in demand.

c. **Encourage local sari-sari/retail stores and restaurants to sell affordable and well-balanced food products and meals**
   - Working with local restaurants or *carinderia* can be a good place to start when it comes to encouraging vendors to make and sell better ready-made foods, which benefits both livelihoods of vendors and the access to nutritious food of low-income families (Watson et al., 2023).
   - LGUs could promote local sari-sari or retail establishments to serve affordable and well-balanced meals by offering incentives and assistance. Local governments, for example, might provide financial assistance to sari-sari stores and restaurant owners so they to acquire nutritious food items in bulk at a lower cost.
   - Another solution is to create a certification program for sari-sari stores and restaurants offering healthy and reasonably priced food items just like in rice subsidies. LGUs might offer incentives to stores that achieve the certification standards, such as tax rebates or marketing support (De Vera-Ruiz, 2023).

d. **Start and promote *kadiwa* markets in barangays**
   - *Kadiwa* markets are a significant endeavor in the Philippines that provides consumers with direct access to economical and high-quality agricultural and fishing products (DA-AFID, 2022).

e. **Collaboration among different stakeholders from Barangays to Municipal Health and Agricultural Offices ~~to~~?**
   - Need for intersectoral collaboration to implement harmonized and relevant solutions: Tirado and colleagues (2022) found that multi-sectoral adaptation must involve the food system, social protection systems,

health system, water and sanitation systems, early warning systems, and risk reduction and risk management, to promote and protect nutrition effectively. Specifically, addressing the impacts of climate change on food security and nutrition requires a) climate-resilient, nutrition-sensitive, and agroecological food production, b) sustainable and healthy diets, c) access to health, nutrition services, and healthy environments, d) early warning systems to prevent adverse effects on nutrition, f) nutrition-sensitive social protection and g) nutrition-sensitive risk reduction, risk sharing and insurance.

CASE STUDY BOX: SUSTAINABLE SOLUTION ADDRESSING MALNUTRITION AND SKYROCKETING FOOD PRICES

World Vision, a child-focused global organization, has developed several projects centered on education, nutrition workshops and programs, small-scale food production, and backyard gardening for families in the Philippines in response to the rising malnutrition crisis. One of their programs, Positive Deviance Hearth in Cebu, is a nutrition and health initiative implemented in partnership with the Ramon boitiz Foundation Inc. Children under the age of five have been enrolled in these sessions to help them improve their hygiene and eating practices. During the sessions, malnourished children are served nutrient-dense meals prepared and cooked by their primary caregivers using affordable ingredients from their local area. Parents of children enrolled in these nutrition workshops receive hygienic food preparation training as well as livelihood support. World Vision also constructed water infrastructure as water towers, handwashing stations, toilets, and water pumps to guarantee that the community has access to clean water and proper hygiene practices. Families with malnourished children also receive livelihood assistance in the form of rice and vegetable seeds and kits. Mothers were allowed to sell some of their produce as part of the backyard garden project, using the proceeds to cover other household needs.

Source: World Vision Philippines. World Vision Scales Up Sustainable Food and Livelihood Programs to Address Growing Malnutrition, World Vision Development Foundation, Inc, 25 Sept. 2023, www.worldvision.org.ph/world-vision-scales-up-sustainable-food-and-livelihood-programs-to-address-growing-malnutrition/. Accessed 20 Jan. 2024.

QUOTE:

- "May ano na lang po kami, 7 po. Dati po ay 12 [na malnutrition cases]. Pero kung ngayong first quarter [...] nadagdagan na naman. [...] Dahil po, ma'am, katulad po sa isang pamilya. Minsan po, di man po natin ano 'yung sa kanila pong hanapbuhay, [...] kulang yung pambili dahil po sa panahon ngayon." **“There were 7 cases of malnutrition before and it now increased into 12. This first quarter of 2023, the malnutrition cases increased. For example in one family, sometimes they don’t earn enough to buy their own food.”** (*Barangay Nutrition Scholar)*

- "'Yung malnutrisyon dito, nasa [desisyon o pagpapalaki] ng magulang. Minsan ang mga bata, wag lang makulit, wag 'sundan ang mga gustong bilhin…mga candy." (*Fisherfolk*) **"The malnutrition situation here depends on the decision or how the parents bringing up their children. The children shouldn't act stubborn. Also, the parents shoudn't follow their children's desires, especially buying candies."**

Table x. Recommended Adaptation Strategies for Alabat

Level of adaptation strategy	Heat stroke	Hypertension	Dengue	Waterborne diseases	Malnutrition	Respiratory diseases
Individual/ Household	● Adopt a healthy lifestyle ● Observe sun-safe behaviors such as staying hydrated, wearing protective clothing and sunscreen and using a hat or umbrella ● Avoid going out during the hottest periods of the day and schedule outdoor activities accordingly ● *Start activities slowly and pick up the pace gradually.* ● *Keep oneself updated on extreme heat alerts and safety tips* ● *Immediately seek medical help*	● Adopt a healthy lifestyle to decrease the risk of being hypertensive by eating healthy, exercising regularly, limiting alcohol intake, avoiding cigarette smoking, getting enough sleep, and maintaining a healthy weight. ● Undergo general health checks to manage risk factors for hypertension and/or take maintenance medication/s to maintain blood pressure control medicine continuously	● Seek early consultation ● Observe the 4 o'clock habit ● *Use screens on windows and doors* ● *Repair holes in screens to keep mosquitoes outdoors* ● *Clean roof guttering or any area where water can be collected* ● *Place larvivorous fish in water containers*	● Practice frequent handwashing ● Ensure that water storage containers are cleaned regularly and are properly stored ● Observe proper food handling ● *Only drink clean/potable water from credible sources*	● Eat a balanced diet ● Avoid junk food and soft drinks ● Maintain a vegetable garden in the backyard ● *Parents should set as a good example to their children by eating well-balanced meals* ● *Involve children in food preparation (Participation gives kids a sense of ownership in the final product)*	● Boost the immune system to the lessen risk of acquiring respiratory diseases ● Avoid burning garbage to prevent asthma exacerbation and lung cancer ● *Be vaccinated against respiratory pathogens* ● *Observe cough etiquette and respiratory hygiene* ● *Seek medical consult to prevent or manage respiratory conditions*

	when symptoms arise ● Semi-annual health assessment in the family to control diseases exacerbated by heat ● *Use low-cost solutions to minimize heat in homes*					
Community /barangay	● *Implement cool spaces using local materials with the help of partnerships and networks* ● Inform the community through workshops on how to protect themselves from the heat.	● *Participate in community support groups for people with hypertension* ● Join physical activity classes to help with blood pressure control ● *Organize and participate in cooking classes to promote healthy food choices*				● Conduct workshops on cough etiquette and respiratory hygiene ● *Engage local champions to help raise awareness on respiratory conditions*

Health system	● Identify and educate populations vulnerable to the effects of extreme heat ● Information dissemination on sun-safe behaviors	● Provide an adequate supply of calibrated sphygmomanometers and anti-hypertensive medications ● *Build capacity of health staff through integrated care team training* ● *Conduct community-based screening for hypertension* ● *Integrate hypertension services into established practices* ● *Conduct monitoring and evaluation of indicators for hypertension*				● *Conduct chest camps providing free chest x-ray and consultation in communities and workplaces* ● *Mobilize local community volunteers who can serve as the link between the community and healthcare facilities for respiratory conditions* ● *Integrate respiratory initiatives into other health programs such as those for HIV infection and maternal and child health*

Local government unit	• *Integrate Sun-safe Behaviors into Policies and Training* • Organize tree nurturing activities • *Promote and maintain green spaces* • *Enact tree and landscape ordinances* • *Install or apply cool roof coating*	• *Improve the built environment to create safe and conducive spaces for physical exercise to manage risk factors for hypertension or enhance BP control* • *Conduct capacity-building among stakeholders on hypertension prevention and control* • *equire food establishments to display nutrition information of food items*	• Encourage communities to maintain the cleanliness of their surroundings • Conduct regular cleanup drives • Regularly inspect and maintain drainage systems to prevent them from being breeding grounds of mosquitoes • *Implement proper waste segregation and disposal* • *Establish a multisectoral dengue action committee to develop the dengue emergency response plan and spearhead surveillance*	• Potable water provision • Allot funding to ensure the delivery of sustainable water and sanitation services • Improve water treatment facilities • Install adequate and maintain proper drainage systems • *Ensure sufficient funding to roll out hand hygiene interventions in schools* • *Provide a sewer system that allows safe waste disposal* • *Conduct regular environmental testing and monitoring, including wastewater surveillance* • *Monitor and test water quality following extreme weather events* • *Develop a water safety plan which includes a system assessment,*	• Continue implementing the 120-day nutribun challenge • Conduct feeding programs • *Ensure support for the disadvantaged, including access to clean water, nutritious whole foods and medicine* • *Ensure access to health, nutrition services and healthy environments, including water and sanitation* • *Provide training or vocational courses that will allow individuals to engage in other sources of livelihood (since economic*	• *Ensure regular waste collection in all barangays* • Strictly enforce smoke-free environment policies • Improve air quality to prevent initiation or exacerbation of respiratory conditions

				effective operational monitoring of indicators, and management and communication plans that describe operating procedures. ● *Issue advisories for consuming fish and shellfish*	*means influence eating habits)*	

VI. Conclusion and Recommendations

- Municipality is already experiencing climate change, many health conditions are now being affected. The health system is expected to address these impacts is now overburdened
- Hence the need for adaptation strategies that address the climate-sensitive conditions and strengthen the resilience of health system. Need to put more health in LCCAP and vice versa.
- This report summarizes the climate health situation of the municipality – state of health system
- Paper presented adaptation strategies at x levels.
- Purpose of report: inform actions, inform potential projects and initiatives including potential funding by the PSF.
- Can also be used as educational tool for health workforce.

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Still has to be reorganized according to their "order of appearance"

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