Health National Adaptation Plan (HNAP)
for preventing health risks and diseases from climate change in Timor-Leste
(2020-2024)

Ministry of Health

Government of Timor-Leste

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Ministry of Health

Timor-Leste

Lists of Acronyms

Aldeia: Sub-village

ARI: Acute Respiratory Illness

CCA: Climate Change Adaptation

CCS: Country Cooperation Strategy

CHC: Community Health Centre

COP: Conference of Parties

CWC: Community Water Scheme

ENSO: El Niño–Southern Oscillation

EPA: Environment Protection Agency

GCF: Green Climate Fund

GEF: Global Environmental Facility

HNAP: Health National Adaptation Plan

IPCC: Inter-governmental Panel on Climate Change

LDCS: Least Developed Countries

MPW: Ministry of Physical Works

MGDs: Millennium Development Goals

MCIA: Ministry of Commerce, Environment and Industry

MOH: Ministry of Health

NAP: National Adaptation Plan

NAPA: National Adaptation Programme of Action

NCDs: Non-communicable diseases

NDMC: National Disaster Management Centre

NDP: National Development Programme

NEHAP: National Environmental Health Action Plan

SC: Steering Committee

SDGs: Sustainable Development Goals

SIDS: Small Island Developing States

Suco: Village

UN: United Nations

UNFCCC: United Nations Framework Convention on Climate Change

WHO: World Health Organization

WSP: Water Safety Plan

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Chapter One

1. Situation Analysis & Rationale of H-NAP development

1.1 Analysis of health situation and development context

Timor-Leste has recently transitioned from a Least Developed Country (LDC) to a Medium Developed Country (MDC), ranking 133 out of 188 states in the UNDP's Human Development Index[1]. The country has a Gini Coefficient of 30.4. Timor-Leste receives a net official development assistance that equates to 6% of gross national income (GNI) [2]. Over 80% of the population depends on the agricultural sector as the main source of income or subsistence, although 30-40% of food is imported[3].Timor-Leste's GDP is USD2.3 billion. Over the past decade, oil and gas resources have come to dominate Timor-Leste's economy. In 2010 the source of Timor-Leste's GDP was 79.3% from petroleum and 20.7% non-petroleum. Non-petroleum GDP in 2010 was composed of agriculture (predominantly maize, rice and cassava), forestry and fisheries (21.4 %), industry and services (56.4%), and public administration (21.5%). Timor-Leste's labour force participation rate is low (30.6%), which reflects the continued prominence of subsistence agriculture [4].

Health care service is a fundamental right of all Timorese guaranteed by the constitution. The commitment of the government towards the constitutional obligation and the government's vision to achieve health for all in Timor-Leste is reflected in the National Health Sector Strategic Plan (NHSSP)[5]. The future direction for the Health sector of Timor-Leste is laid out in the NHSSP 2011–2030 which was developed in line with National Strategic Development Plan (NSDP) 2011–2030 and guides Timor-Leste's

[1] Human Development Report, UNDP, 2015.

[2] Human Development Report, UNDP, 2015.

[3] Ministry for Economy and Development, 2010,Timor-Leste National Adaptation Programme of Action to Climate Change

[4]National Statistics Directorate, 2013, Timor-Leste Labour Force Survey 2013 http://www.statistics.gov.tl/wpcontent/uploads/2015/04/LFS_2013_ENGLISH_VERSION.pdf

[5] Ministry of Health, 2015.Plan of the National Institute of Health 2015-2019. Dili: Ministry of Health

Health Sector programs and projects[6]. The strategic plan outlines the structure and process for governance, processes for improving health system and health services delivery the government has committed to. Based on the NHSSP, the MoH programmes and institutions are also developing more details strategies and implementation plans towards their respective targets. A Comprehensive Service Packages (BSP) services at different levels have been defined and structural and programmatic adjustments are being done in the ministry of health and its network to enhance its effectiveness delivering the services and meeting its obligations to the citizen. The Ministry of Health designs, directs, manages and coordinates all government health care and pharmaceutical policy and activities throughout the country.

In Timor-Leste, access to health services poses a major concern as 70% of the population lives in rural areas in small, dispersed villages isolated by mountainous terrain and poor road conditions[7]. It is also reported in that strategy that Timor-Leste has one of the highest malnutrition rates in the world with Timorese children suffering the highest levels of stunting and wasting in the WHO SEARO region. Malnutrition among women also remains a serious concern. Micronutrient deficiencies such as iron, vitamin A and iodine constitute a major challenge.

The demographic health survey of 2016[8] showed improvement in some of the key health indicators and most significantly decline in child mortality. Some of the key achievements of health sector that have contributed to the overall decline in child and maternal mortality are:

- 92% of women in urban areas received ANC from a skilled provider, compared with 81% of those in rural areas.
- Elimination of Maternal and Neonatal Tetanus
- The total fertility rate is 4.2 children, a decline from 5.7 in 2009-10.

[6] Ministry of Health, 2011, National Health Sector Strategic Plan 2011-2030

[7] WHO Country Cooperation Strategy, Timor-Leste (2015-2019)

[8] General Directorate of Statistics (GDS), Ministry of Health and ICF. 2018. Timor-Leste Demographic and Health Survey. Dili: Ministry of Health and Rockville, Maryaland, USA: GDS and ICF

- Under-five children mortality, infant mortality and neonatal mortality has declined to 41,30 and 19 deaths per 1,000 live births in the most recent 5-year period
- The prevalence of stunting has declined from 58% to 46% since the 2009/10 DHS.
- The prevalence of underweight children has also declined, from 45% to 40%. However, the prevalence of wasted children has increased from 19% to 24%
- The proportion of births taking place in a health facility more than doubled since 2009-10, from 22 percent to 49% in 2016
- Access to an improved source of drinking water has increased from 63% in the 2009-10 DHS to 79% in the 2016 DHS (92% of urban households and 74% of rural households)
- The percentage of households with access to an improved sanitation facility has increased from 41% in the 2009-10 DHS to 50% in the 2016 DHS.
- The percentage of households resorting to open defecation has declined from 37% to 27% and has declined in both urban and rural areas.
- Reduction in the incidence of common communicable diseases such as Diarrhea, Malaria, and Acute Respiratory Infections and improvement in care-seeking during illnesses
- Increase in contraceptive use and marked decline in total fertility rate
- Improved access to sanitation, improved access to clean water
- Adaptation and mainstreaming of implementation sof evidence based child survival and high impact nutrition interventions nationwide through Basic Package of Services
- Expansion of community health outreach, health volunteers and mother support groups, the good practices that lead to improvement in home and community care for children especially exclusive breast-feeding rate

Timor-Leste has a three-tiered referral system[9]. The three tiers include one national tertiary hospital, five district referral hospitals and numerous community health centres and health posts. At the district/municipality level, primary health care is provided through a network of Community Health Centres (CHCs), Health Posts (HPs) and SISCa (Servisu Integrado Saude Comunitaria).

Timor-Leste is an example of a WHO SEARO member country with a tax-based health system in which health services are provided free at the point of use[10]. Timor-Leste operates a predominantly publicly financed and provided health system, as a result, proportionate government contributions to health care spending are large (90% of total health care expenditures)[11].

The environmental health risks that will be affected by climate change in Timor-Leste are summarized below:

a) Vector-borne diseases

Vectors are organisms that transmit pathogens and parasites from one infected person to another, causing serious diseases in human populations. Common vectors are mosquito, fly, mite, mice etc. Mosquitoes are the most common vectors which cause malaria, dengue, encephalitis, filariasis and yellow fever. Two mosquito borne diseases responsible for significant health risk are malaria and dengue caused by Anopheles and *Aedes* mosquitoes in Timor-Leste. Effective means of controlling vector borne disease lies in control of vector or remain away from them. Climate change affects distribution and expansion of vector-borne diseases. Mosquito can be controlled by eliminating breeding sites such as stagnant water and other vectors by cleanliness of house and surroundings. Department of Communicable Disease (CDC) has developed strategy for control of dengue and

[9] Ministry of Health, 2015. Plan of the National Institute of Health 2015-2019. Dili: Ministry of Health

[10] Guinness, L., Paul, R.C., Martins, J.S., Asante, A., Price, J.A., Hayen, A., Jan, S., Soares, A. and Wiseman, V., 2018. Determinants of health care utilisation: the case of Timor-Leste. *International health*, *10*(6), pp.412-420 (accessed from https://academic.oup.com/inthealth/article/10/6/412/5051851)

[11] World Bank . Health equity and financial protection report – Timor-Leste. Washington, DC: World Bank, 2014. http://documents.worldbank.org/curated/en/959881467992506455/pdf/103445-WP-P146116-Timor-Leste-Health-Equity-and-Financial-Protection-Report-FINAL-PUBLIC.pdf.

malaria and guideline for promotion. For dengue there are regular promotion activities in the sub-district level. For malaria there is intensive program including indoor residual spraying, distribution of LLINS and education program. The number of reported dengue / dengue haemorrhagic fever (DHF) / dengue shock syndrome (DSS) cases increased by 120% in 2017, as compared with 2016. Most of the cases were reported from Dili, followed by Ermera, Lautem, Bononaro and Baucau. The number of reported dengue/DHS/DSS cases increased in January, peaked in February, started to decrease from March until July, and presented a minimal number of cases until the end of the year. Analysis of climatic data and dengue cases shows significant relationship in Timor-Leste. Rise in temperature (average, maximum and minimum) is found to increase dengue occurrence with relatively high effects size since 10.85% rise in dengue incidence per 1^0C increase in average temperature is detected and the directional effects seems to be consistent as well though not in its magnitude[12]. Previous study shows that dengue in Timor-Leste is highly seasonal with inter annual variations with significant inter-annual variability. Furthermore, climatic factors including mean temperature and precipitation were important predictors of dengue cases. In addition, children and females are at higher risk of dengue.

The risk of vector-borne diseases is expected to increase due to climate change, due to increasing temperatures, changing patterns of precipitation, increasing urbanization, and population migration. Deaths due to malaria are among the leading causes of mortality and morbidity in Timor-Leste and are reported as 16.2 per 100,000 people [3]. By 2070, under both high and low emissions scenarios about 2.76 million people in Timor-Leste are projected to be at risk of malaria, an increase from about 600,000 people at risk annually during the baseline period of 1961-1990 [10]. In recent years, the activities of the Ministry of Health's National Malaria Control Programme, including the widespread introduction of Rapid Diagnostic Test kits, improved surveillance, distribution of insecticide-treated nets and indoor residual spraying, have proved highly effective in reducing malaria incidence in Timor-Leste[2].

[12] MOH and WHO (2018). Health Vulnerability and Adaptation Assessment to Climate Change in Timor-Leste. Dili: Ministry of Timor-Leste and WHO Country Officer for Timor-Leste

The country is nearing malaria elimination, and may pursue elimination in the coming years as part of a Global Fund project.

Modeling of climate change impacts on dengue and malaria in Timor-Leste suggests that the number of districts at high risk may increase in the future, however after 2040 it might decrease[2]. Currently, Manatuto district has the highest dengue risk, while Viqueque and Lautem have the highest malaria risk. Beyond dengue and malaria, there is very limited modelling and analysis of the impacts of climate change on health in Timor-Leste. Children and women are two groups highly vulnerable to these vector-borne diseases.

b) Water, sanitation and hygiene related diseases

For the whole Pacific region (including Timor-Leste), climate change is expected to impact the incidence of water-borne disease through heavy rainfall, flooding, drought and increased temperatures[15]. Key risks include faecal contamination of water through heavy rainfall or flooding, and increased concentrations of chemical and microbiological contaminants of surface water leading to gastrointestinal disease. In Timor-Leste, an estimated 50% of households have no toilet facilities, and less than 60% of households have hand washing facilities[11]. Both of these factors are important background statistics that link into water-borne disease incidence and distribution. High rates of diarrheal disease have been noted following flooding in the Pacific region including Timor-Leste, and climate change is expected to exacerbate the risk of diarrheal illness [15].Drought, resulting in a lack of clean water for drinking, cooking and cleaning, can also exacerbate contamination risk [15]. The Initial National Communication for Timor-Leste reports that water scarcity will become more serious in the future particularly in the areas with a longer water deficit period [2]. Children, the elderly and those with underlying health conditions are specifically vulnerable to water-borne diseases.

UNICEF reports that in an effort to assess the impact of El Niño on lives and properties in Timor-Leste, a related inter-cluster rapid assessment took place late 2015, which reported that more than 100,000 people living in the northern part of the island are potentially at risk of facing a severe shortage of drinking water, especially those relying on small springs, dug wells and community managed water systems [13]. A rotavirus survey conducted between 2014 and 2016 found that approximately 32% of acute diarrhea cases tested positive for rotavirus infection[21]. The WHO and MOH are conducting rotavirus genotyping and performing a cost benefit analysis of the introduction of the rotavirus vaccine onto the infant vaccine schedule. If the vaccine is introduced it would be expected to significantly reduce the hospitalization and death of under-five year old children due to acute all-cause gastroenteritis.

Water safety planning has been conducted in some communes in Timor Leste. While individual communes likely do not prioritize climate change adaptation, the climate-sensitive WSP process will help identify community WASH priorities and incorporate adaptation efforts into work on those priorities. A similar mechanism will support the participation of healthcare facility staff. Overall, the project will leverage the no-regrets approach climate change adaptation to unite risk mitigation activities and community priorities.

c) Food security and nutrition related illness

Higher temperatures are expected to increase the incidence of heat-related diseases and may result in increased risk of malnutrition, but district or village-level vulnerability assessments have not been undertaken [1]. In addition, extreme events can lead to food-borne disease outbreaks, including salmonella, campylobacter, listeria, and cholera [14]. The interaction between malnutrition and diarrhea in children in Timor-Leste is of particular concern.

[13] UNICEF Annual Report, Timor-Leste, 2015. https://www.unicef.org/about/annualreport/files/Timor_Leste_2015_COAR.pdf

[14] Australian National University, 2011, Overview of climate change impacts on human health in the Pacific Region. Report prepared for the Australian Government's Pacific Adaptation Strategies Assistance Program http://www.environment.gov.au/climate-change/adaptation/publications/climate-change-impacts-human-health-pacific

The Initial National Communication report identifies climate change implications for food security, including the difficulty with increasing cropping intensity without supporting irrigation water; in some parts of the north coast of the country planting crops even once a year is not possible. It is projected that climate change will result in a reduction of maize yield between 4% and 20% from the current yield, depending on climate scenarios. In addition, crop failures due to extreme climate events may also increase [2].

Preliminary findings of a project undertaken in 2015/16 to better understand the impact of drought and long-term drying on agriculture and food security [15] identified that the majority of households in the study (72.9%, 121,958 households) are impacted by drought. Approximately 40% (estimated 62,717 households) experienced food insecurity in the last three months (Dec 2015 – Feb/Mar 2016), and a slightly higher proportion of almost 46% (estimated 68,183 households) were expecting to experience food insecurity in the next three months (Mar/Apr – Jun 2016). In addition, 21% (estimated 25,611 households) of the drought-affected households reported sick animals and 48% (estimated 60,430 households) reported the death of animals, including pigs, cows, buffalos, due to the lack of water and fodder. In terms of agriculture production, 51% of the study households reported maize not growing well, and 10% reported the failure of their maize crop. Rice was reported as not growing well by 43% of households, with 6% reporting the failure of their rice crop. Vegetables were reported as not growing well by 49% of households, with 4.5% reporting the failure of their vegetable crop.

The period between October and March is particularly severe for food shortages and household food insecurity, with Covalima, Bobonaro, Ermera, Manatuto, Baucau, Lautem and Oecusse reported as the most food-insecure districts in the country [16].
As indicated, Timor-Leste is mostly mountainous with limited land suitable for agricultural purposes. Further complicating these barriers to agricultural production

[15] Resultado Preliminario: Avaliasaun Rapidu-Impaktu Bailoron-naruk ba Agrikulturaiha Timor-Leste. 2016
[16] The Timor-Leste Survey of Living Standards (TLSLS) 2007

is the land tenure system in the country, which has a complex history; many farmers do not own land, while those who do often have only small amounts that are not adequate to sustain their families. In addition, Timor-Leste is vulnerable to international food market volatility due to its relatively high dependence on food imports. Imported food is largely unaffordable for poor families.

In a report on climate change and food security in the Pacific Islands and Timor-Leste prepared by the Secretariat of the Pacific Community and CSIRO, it is suggested that Timor-Leste faces a range of long-term food security issues and that climate change will increase existing risks to food security, particularly in relation to increased exposure to extreme weather events[17]. Further research needs to be undertaken on the vulnerability of Timor-Leste's agriculture, fisheries, and food processing and storage network, to better understand implications for human health and which particular communities or groups are most at risk of hunger and malnutrition as a result of climate change.

d) Air quality and air-borne diseases

Exposure to smoke inside the home, either from cooking with solid fuels or from smoking tobacco, has potentially adverse health effects. Eighty-seven percent of households use solid fuels, consisting mostly of firewood or coal for cooking (more common in rural areas (95%) than urban areas (58%). In rural areas of Timor-Leste, more than 95% of the population primarily uses solid fuels (biomass or coal) for cooking[18]. Exposure to cooking smoke is greater when cooking takes place inside the house. The Demographic and Health survey of 2016 shows that 62% of households cook outdoors under a cover, 14% cook outdoors, and 12% each cook

[17] Secretariat of the Pacific Community, 2011, Food security in the Pacific and East Timor and its vulnerability to climate change. Report prepared for the Australian Government's Pacific Adaptation Strategies Assistance Program http://www.environment.gov.au/system/files/pages/275228c5-24db-47f2-bf41-82ef42cda73d/files/food-security-report.pdf

[18] General Directorate of Statistics (GDS), Ministry of Health and ICF. 2018. Timor-Leste Demographic and Health Survey. Dili: Ministry of Health and Rockville, Maryaland, USA: GDS and ICF

in a separate building and inside the house. Furthermore, exposure to tobacco smoke is high in Timor-Leste and in 51% of households; someone smokes inside the house on a daily basis. Ambient air quality data of Timor-Leste is not available. In Timor-Leste, 62% percent of an estimated 500 child deaths due to acute lower respiratory infections is attributable to household air pollution[19]. Global data estimate that 48% of total deaths from ischaemic heart disease, stroke, lung cancer, chronic obstructive pulmonary disease and acute lower respiratory infections (under 5 years) are attributable to household air pollution. Women and children are at greater risk from household air pollution.

e) Heat related illness and occupational hazards

Higher temperatures and longer heatwaves are expected to increase the incidence of heat-related diseases, but district or village-level vulnerability assessments have not been undertaken[20]. Under a high emission scenario heat-related deaths in the elderly (65+ years) are projected to increase to about 39 deaths per 100,000 by 2080 compared to no estimated deaths during the baseline period between 1961 and 1990[21]. The elderly, children, those with chronic illness, the socially isolated and at-risk occupational groups are particularly vulnerable to heat and its health implications.

Concern of healthy workplace in Timor-Leste is growing in recent years. With increasing construction works and growing industries has put pressure to go for healthy workplace. There are about 1800 industries of which 900 have been supported by Directorate for Industry. Directorate for Industry has inventories of industries that are monitored for sustainability of business. Directorate is thinking to

[19] Burden of disease from Household Air Pollution for 2012, World Health Organization, 2012

[20] Ministry for Economy and Development, 2010,Timor-Leste National Adaptation Programme of Action to Climate Change

[21] Climate and Health Country Profile – 2015: Timor-Leste. WHO & UNFCCC. 2015. Geneva.

include criteria related to healthy workplaces and environmentally friendly business in collaboration with health and environment sectors. Directorate for labour and trade is the focal agency for healthy workplace. Directorate has promulgated Labour Code 2012 which explains right of workers and safety hygiene and health of workers as well. Company with more than 30 workers need to set up joint committees of workers and employer but company with high risk need to set up such committee irrespective of size. Size of committee members depends on numbers of workers. Safety of workers and social division is encouraging people in safety issues and doing regular inspections of work places. They organize regular workshop and seminars and make announcement in the working places. They have offices in five districts and in the other districts there is SEPFOPE units under district administration offices. Inspection team goes to workplaces and record regularities and irregularities in line with Labour Code. Inspection form is prepared in three copies one (yellow) for Labour, other (White) for employer and another (pink) for office. For irregularities there will be penalty.

f) Waste management and public health risks

There is no systematic process for waste management in the country including municipal waste, industrial waste and waste from hospitals[22]. In urban areas refuse is generally placed in large open street-level bins and collected. In peri urban area of Dili and district towns there are constructed box for waste collections in the side of the roads. Street in the main cities are regularly cleaned. There is very good system to clean street and public places by all people on Friday. Waste is frequently raked into heaps and burnt. The burning of refuse produces health-damaging air pollutants, fine particulate matter, volatile organic compounds and greenhouse gases. The burning of plastic wastes, as is so common in East Timor, is particularly damaging to health and the environment. Furthermore, haphazard disposal of wastes become breeding places of mosquitoes and rodents.

[22] Environmental Health Strategy, Ministry of Health, Government of Democratic Republic of Timor-Leste 2015

Directorate for Basic Sanitation is focal body for management and technical support for the solid waste management and district administrators and local bodies are responsible for waste management. Ministry of environment has also involved in implementing solid waste management in Dili. There is some confusion among government agencies on role of solid waste management. Basic sanitation policy which also covers solid waste and waste water indicated many agencies as responsible. Ministry of health is primarily responsible for medical waste management. Health-care waste contains potentially harmful microorganisms that can infect hospital patients, health workers and the general public. Other potential hazards may include drug-resistant microorganisms which spread from health facilities into the environment. Open burning and incineration of health care wastes can, under some circumstances, result in the emission of dioxins, furans, and particulate matter which adversely affect human health[23]

g) NCDs, injuries and mental health

Timor Leste is facing a double burden of disease. Communicable diseases such as TB, Malaria and Dengue continue to pose a public health challenge. However, due to effective measures by the government, these diseases are coming down. On the other hand, NCDs such as cardiovascular, chronic obstructive pulmonary diseases have emerged among the top ten causes of mortality. Hospital authorities are unanimous in their opinion that admissions due to these diseases are on the increase in the hospitals and are also getting younger. The data on admissions and deaths from the public hospitals confirm this trend. Based on this data 22.4% of deaths were due to NCDs, which was equivalent to that of communicable diseases[24]. Almost half of the deaths were classified as due to non-specific causes. Admissions due to NCDs were lesser indicating probably, higher case fatality rate of NCDs.

[23] https://www.who.int/news-room/fact-sheets/detail/health-care-waste

[24] National Strategy for Prevention and Control of Non-communicable Diseases (NCDs), Injuries, disabilities and care of the elderly & NCD National Action Plan 2014-2018, Ministry of Health Timor-Leste 2014

Government of Timor Leste recognizes the growing problem of NCDs and also the limitations of the current health system response to it. It is reported that only 10% of deaths occur in the hospitals and even in those deaths almost 50% remain unclassified. Like in other developing countries, vital event registration system is not fully functional and only way of counting deaths is during time of Demographic Health Surveys. However, these do not elicit causes of death. Morbidity Data is currently available only through the hospital based reporting and no disease registries exist. The main source of risk factor data was from DHS, which was not geared to measure NCD risk factors. The current national health system in Timor-Leste is mainly geared towards addressing maternal and child health and communicable diseases. Every year around 250-300 patients are referred to Indonesia for high end treatment for which Ministry of Health budgets a cost of US$ 4 million[25]. Many of these are NCDs and significant resources can be saved if these diseases are managed at an earlier period through the primary health care and if the tertiary care is strengthened. Like elsewhere, climate change can further affect incidence of NCDs.

h) Disasters and health

Natural disasters affected 951 per million people on average each year in Timor-Leste. Dili experiences on average eight tropical cyclones per decade, but their effect is weak[26].El Niño and La Niña have resulted in serious damage and disasters affecting different socioeconomic sectors of the country. Observations have indicated that El Niño events will become more frequent[27]. The International Disaster Database (emdat.be) reports that between the period 1990-2014 floods were responsible for 71.4% of disasters, with droughts and storms each responsible for 14.3% of disasters recorded. Floods were responsible for all of the reported

[25] National Strategy for Prevention and Control of Non-communicable Diseases (NCDs), Injuries, disabilities and care of the elderly & NCD National Action Plan 2014-2018, Ministry of Health Timor-Leste 2014

[26] Pacific Climate Change Science Program, 2011, Climate Change in the Pacific: Scientific Assessment and New Research, Volume 2: Country Reports, Chapter 3: East Timor, http://www.pacificclimatechangescience.org/publications/reports/report-climate-change-in-the-pacific-scientific-assessment-and-new-research/

[27] Secretariat for Environment, 2014, Timor Leste's Initial National Communication

mortality. The number of hazard events recorded during 2001-2011 for strong winds, floods and landslides reached 198, 150 and 38 events respectively, based on data from the Secretary of State of the Social Assistance and Natural Disasters. An average of 7,200 people each year are projected to be affected by flooding due to sea level rise between 2070 and 2100 [28]. Agricultural production and thus livelihoods and human health are substantially affected by natural disasters, which poses challenges to the population due to the heavy reliance on agriculture for survival.

Timor-Leste has incorporated and implemented a number of policies, priorities and strategies on climate change since Independence in 2002: the country ratified the United Nations Framework Convention on Climate Change (UNFCCC) in October 2006, Kyoto Protocol in 2008, Convention to Combat Desertification (UNCCD) in August 2003 and became a party to the Convention on Biological Diversity (UNCBD) in January 2007. In terms of specific national climate change policies, priorities and strategies, Timor-Leste developed and submitted a National Adaptation Programme of Action (NAPA) in 2010, submitted its Initial National Communication (INC) to the UNFCCC in 2014 and intended nationally determined contribution (INDC) in 2016. These have detailed the directions for climate change programmes and integration into achieving climate-resilient development goals. In 2015, this included adopting the 2030 Agenda for Sustainable Development and the Sustainable Development Goals (SDGs), including Goal 13 (to take urgent action to combat climate change and its impacts) and including:

- The strengthening of resilience and adaptive capacity to climate related hazards and natural disasters.
- The integration of climate change measures into national policies, strategies and planning.

[28] Climate and Health Country Profile – 2015: Timor-Leste. WHO & UNFCCC. 2015. Geneva.

- Education, awareness raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning.
- The promotion of mechanisms for raising capacities for effective climate change related planning and management in LDCs, focusing on women, youth, local and marginalized communities.

Timor-Leste is currently undertaking its Second National Communication to the UNFCCC, developing national climate change policies and is also preparing for developing a National Adaptation Plan (NAP). Climate change is also embedded in the overarching national strategy –the Strategic Development Plan (SDP) 2011 – 2030 for Timor-Leste, which includes ambitious targets for achieving ecological balance in safeguarding the natural resources and economic needs for the country's sustainable development. However, Timor-Leste is still in the process of developing policy, legal and institutional structures for health, the environment, disaster management, and climate change, and lacks strong coordination mechanisms to effectively mainstream climate change-related health concerns into different sectors. It also lacks strong capabilities in public health and disaster-related data collection and analysis, which would enable a better understanding of vulnerability at different scales.

As a member of the Alliance of Small Island States, Timor-Leste shares similar vulnerabilities to climate change as other alliance members: more frequent and severe extreme weather events, sea-level rise and saline intrusion, issues of food and water security, heat stress, and increased incidence of vector-borne diseases. Through the NAPA, Timor- Leste is specifically targeting health sector capacity to anticipate and respond to the health impacts of climate change[29].

There are nine components within the Environmental Health Strategy 2015 – safe water and availability, sanitation and hygiene, food safety, vector control, waste management, healthy working place, safe housing and settlement, air quality, and

[29] Secretariat for Environment, 2010, Timor-Leste's National Adaptation Programme of Actions to Climate Change

climate change and health. While many of these components have clear direct and indirect links to climate change, the strategic action points that are documented in this strategy specifically in relation to climate change include the development of national policy and strategy on climate change; the review of policy, strategy, standards and guidelines of all development sectors in respect of climate change and updating these in order for them to be climate resilient; strengthen existing Adaptation Thematic Working Group for climate change and health and intensity meeting for more coordinated action to minimize the health impact of climate change; carry out research to explore the potential impact of climate change on health in various regions of the country, develop alternative technology or ways of living; and take action to protect public health from potential climate change with priority to most vulnerable groups, and develop alternative adaptation mechanisms.

The climate change interventions are normally integrated into the public health interventions across priority disease control (malaria, dengue), surveillance, health promotion (including the school health) and environmental health interventions (vector control, water safety plans and hygiene and sanitation). It also spreads across control of NCDs, Healthy Ageing and Nutrition programs. Although these programs are under the National Directorate of Public Health, they are not well coordinated within the climate change initiatives, due to:

- Limited capacity of human resources and funding to invest on equipment and system’s development.
- Limited capacity of the Surveillance systems for early detection and early warning systems for timely response.
- Lack of coordinated training to address common programmatic gaps.

National Public Health Laboratory needs further enhancements to be able to provide services for supporting diagnosis and treatment of climate sensitive diseases. The MOH has three different departments looking after data collection, data analysis and reporting: the Surveillance Department under the National Directorate of Public

Health, the Health Management and Information System (HMIS) Department and the Monitoring and Evaluation Department under the National Directorate of Policy, Planning and Cooperation. Nevertheless these departments are not well integrated in terms of data sharing and number of indicators to be monitored and report for timely decision making. These fragmentations introduced data discrepancies and are also undermined the quality of data used for evidence based planning, monitoring and evaluation. Major gaps/barriers are summarized below:

i. Limited capacity of Ministry of Health to address health risks of climate change

Funding for the health sector is limited. The MOH is allocated approximately 9% of the annual budget. The funding is based on historical expenditures, but not based on the program's needs and country priorities. Therefore, new initiatives such as climate change programming is less likely considered as a priority due to lack of awareness and political commitments. The MOH also faces challenges of high turnover of staff due to lack of a human resource systems for planning, recruitment, capacity building and staff retention. Although, the MoH applies bottom up planning, where each Municipality prepares their own planning and submits to the National level, the distribution and allocation of resources largely depends on population without considering other pre-defined factors such as disease prevalence, geographical barriers, basic infrastructure and opportunity costs for service delivery.

ii. Limited Epidemic Prediction and Response Capabilities

As described above, there are significant gaps in existing surveillance systems, and the resulting lack of data inhibits epidemic prediction and response. No research has been done to identify the link between weather and disease incidence, and meteorological and disease surveillance data are not consistently shared across departments and ministries. Without data sharing it is not possible to develop the epidemic early warning systems necessary to target outbreak prevention activities.

iii Service Delivery Vulnerability

The current disease control program in TLS relies on vertical programs particularly for diseases under the GFATM: HIV/AIDS, TB and Malaria. This also applies for other priority disease control programmes which are implemented mainly donor-driven. Therefore, all the climate related diseases are not well coordinated in order to address the overall burden of diseases due to climate change. Healthcare providers and community members have limited knowledge of the prevention, diagnosis, and treatment of climate sensitive diseases. Healthcare providers often do not have access to treatment guidelines for climate sensitive diseases, and households do not have the knowledge or resources to prevent these diseases or to seek treatment when they become ill. Access to improved water and sanitation facilities, which is protective of many climate-sensitive diseases, is low in rural areas. Where individuals do have access to improved water and sanitation, it is often vulnerable to the floods and droughts that are expected to become more frequent with climate change. Healthcare facilities are vulnerable to extreme weather events and may become inoperable during disasters when their services are urgently needed.

1.2 A Statement of the purpose of H-NAP in addressing the problem and the beneficiaries of the plan implementation

The United Nations Framework Convention on Climate Change (UNFCCC) in 1992 and its Kyoto Protocol adopted in 1997 refer to the legal frameworks that maintain the international climate change process and agenda. Article 1 of the UNFCCC 1992 refers to health, which has one of the adverse effects of climate change and the article 4 refers to commitments of countries to assess the health implications of adaptation and mitigation policies. Similarly, the Cancun decision on the UNFCCC in 2010 has also identified health as a priority in climate adaptation actions. Parties to the UNFCCC have decided to provide financial support to the Least Developed Countries (LDCs) from the LDC Fund to formulate and implement the National Adaptation Plan (NAP). The LDCs and developing countries may wish to secure funding from the Green Climate Fund (GCF) through its readiness program. As Timor-Leste has negligible greenhouse gas emission, it has to build its adaptive capacity and resilience to cope with the adverse impacts of climate change.

The Paris agreement adopted at COP 21 in Paris, on 12 December 2015 marks the beginning of a new era in the global response to climate change. As stated in the agreement, “the right to health”, will be central to the actions taken. The Agreement not only sets ambitious aims to curb greenhouse gas emissions to keep global warming well below 2°C, it also commits countries to strengthen adaptation. This includes implementing plans that should protect human health from the worst impacts of climate change, such as air pollution, heat waves, floods and droughts, and the ongoing degradation of water resources and food security. It commits countries to finance clean and resilient futures in the most vulnerable countries. Through monitoring and revision of national contributions every five years, the world will begin to see improvements not only in the environment, but also in health.

The 70th regional committee ministerial level meeting of WHO SEARO held in Male' in 2017 passed Male' Declaration signed by health ministers which will be implemented through a regional framework for action 2018-2022. One of the activities outlines in the framework is for all countries to have an HNAP. Similarly, *Third Global Conference on*

Health and Climate Change was organized in March 2018 as a regionally dispersed conference with a focus on Small Island Developing States (SIDS) in Mauritius, specifically for SIDS from Africa and South East Asia Region, on 21-22 March 2018. Timor-Leste and Maldives are included as SIDS from WHO SEAR. One of the outcomes of the conference is "Regional Plan of Action for SIDS in the African and South East Asian Regions, 2019-2023" and corresponds to the implementation of *WHO Special Initiative on Climate Change and Health in SIDS* in the African and South-East Asian Regions of the WHO. One of the indicators developed in the action plan is number of countries with an HNAP, as part of the overall NAP. Beside these, National Adaptation Programme of Action 2010, Initial Communication Report to UNFCCC 2014, and Indented Nationally Determined Contribution of Timor-Leste has identified the need of intersectoral approach for addressing health risks of climate change through development of action plan. Hence, there is a high level political commitment for HNAP development in Timor-Leste.

To achieve the goals of healthy people in healthy communities, it is critical that the health sector is properly represented in the NAP process. Excluding the health sector in adaptation planning can miss critical actions to protect population health, and can result in policies and programs in other sectors inadvertently causing or contributing to adverse health impacts, thereby undermining efforts to protect the environment. The HNAP process should be a health component of the NAP and should be align with overall NAP process when Ministry of Environment starts NAP formulation process. The health adaptation plan is designed to achieve the national health adaptation goals within a specific period of time and given available resources.

Timor-Leste is planning NAP formulation process in accordance with its climate change policy framework and their by developing a National Adaption Plan (NAP). To this end sectoral Adaptation Plans are required to strengthen this process and increase adaptive capacity of vulnerable sectors. Taking into consideration of future health risks of climate change, HNAP is developed to ensure that the management of health risk of climate change is integrated into the overall NAP process including assessing risks, identifying, prioritizing and implementation of adaptation options. Therefore, key purpose of HNAP

is to holistically address environmental health risk of climate change. Since the interaction between environment and health is far more intimate and complex than is commonly understood; the HNAP will broaden the linkages between the two and recognize key environmental health issues and bring right interventions. HNAP will also strengthen intra/intersectional approach in understanding and addressing the key environment and climate change key issues including social issues. Since some of the environmental health issues are not within the control of Ministry of Health, program need to collaborate with other relevant agencies and programs having specific mandates to address key public health issues.

HNAP provides the overall strategic direction for strengthening health systems to protect health from climate change. It also identifies and addresses medium- and long-term adaptation needs, including upstream drivers of health risks, taking into consideration the physical, social, and biological determinants of health. The latter is particularly important in Timor-Leste, where burdens of non-communicable diseases and poverty are high with many populations living in low-lying areas susceptible to sea level rise. Further, the HNAP will help in persuading non-health sectors to consider the public health implications of their policies through stronger collaboration with relevant agencies. Therefore, this HNAP will be a good start in defining the roles and responsibilities of environmental health program within the ministry of health and with partner ministries in including health in their policy, plans and programs to address common concerns in coordinated manner. Finally, HNAP may also provide better opportunity for fund mobilization for health adaptation process.

1.3 An analysis of strategic priorities based on the opportunities and gaps identified in the situation analysis

The impact of climate change on the health outcomes of the population in Timor-Leste is complex and manifold. Direct impacts of climate change on human health include exposure to thermal extremes and damage to public health infrastructure, increased frequency of physiological disorder and injuries, due to the increase in frequency and/or intensity of extreme weather events. Indirect impacts include disturbances to ecological

systems that result in changes to the geographical range and incidence of vector- borne diseases, infectious diseases, malnutrition and hunger that in turn disturb child growth and development. The rise of sea level may also force population displacement and cause damage to infrastructure which will lead to increased susceptibility to infectious diseases and psychological disorders. Many infectious diseases such as malaria, dengue fever, diarrhea and other water and food borne diseases are found to be susceptible to climate change. Increasing temperatures may create more favourable conditions for vectors' development. Precipitation is another important factor that influences insect growth rates, especially mosquitoes and black flies because many of these species breed in the residual water that remains after flooding during the wet season. However, heavy rainfall may wash vector larvae away or kill them directly.

Extreme climate events such as storms and floods directly cause deaths and injuries, and can also have indirect effects on communicable diseases and livelihoods. It is found that Timor-Leste faces high levels of exposure to disaster hazards and that there are many vulnerable elements exposed to these hazards. El Niño and La Niña have resulted in serious damage and disasters affecting different socioeconomic sectors of the country. Observations have indicated that El Niño events will become more frequent.

It can be concluded that climate change has a huge impact on the health outcomes of Timor-Leste. Therefore, financial and technical support is needed for building capacity to assess and monitor vulnerability to climate change-related health risks protecting the human from climate change. Public awareness and action on prevention of climate change-sensitive diseases should be increased. Support is needed for the assessment of the effectiveness of health emergency management measures to reduce the impact of extreme events on health with the development of appropriate evaluation methods and pilot studies. Improving the health sector by addressing the policy enhancement, strengthening surveillance systems, improving service delivery and resource mobilization can ultimately reduce the health impact from the climatic variability and change

Despite the inherent degree of uncertainty of climate predictions and the complexity of the impact on health in Timor-Leste, priority adaptation actions can be identified. These actions should strengthen already existing health programmes: such as those aiming to reduce morbidity and mortality from extreme weather events, to secure access to safe water, food and improved sanitation, and to enhance vector-borne diseases surveillance and control. Therefore, successful and cost-effective adaptation in the health sector is based on including climate change considerations into all main budgeting and strategic health planning processes. Simultaneously these have to be aligned with the overall National Adaptation Plan (NAP) process to climate change.

WHO's 'operational framework for building climate resilient health systems' promotes ten essential components, which together form a comprehensive approach to health adaptation planning. Relating to the six health sector building blocks, these interrelated components can provide a structure for identifying adaptation actions which would mainstream climate change into sector-wide or vertical programs. Climate change threatens health through environmental determinants strongly mediated by social conditions and hence, promoting a "health in all polices" approach is necessary. As a next step, it will be crucial to include the identified adaptation actions into the national budget and planning process, and to mobilize additional funding for those activities that cannot be covered by available financial resources.

The adaptation strategies and activities can be identified using the WHO operational framework for building climate resilient health systems which has prioritized following components.

1. **Leadership and governance** which refers to the strategic interventions of the scope and magnitude of climate related stress and shocks to health system now and in the future; and their incorporation into strategic health policy, both within the formal health system and in health-determining sectors. Close collaboration is needed between ministries of health and environment, to ensure access and utilization of the latest understanding of environmental factors that can influence the burden of climate sensitive health outcomes. There are multiple international

organizations that can provide technical and/or financial support for political engagement, technical programs, raising awareness, and mobilization of financial resources.

2. **Health workforce** which refers to strengthening of technical and professional capacity of health personnel, the organizational capacity to work with other sectors such as meteorology, disaster etc. Limited efforts are underway for training and capacity building of health workforces in Timor-Leste, to make sure public health and healthcare professionals have the knowledge and tools necessary to build climate-resilient health systems. Training and awareness raising are needed in Ministries of Health and educational institutions at all levels, and in community groups and the media.

3. **Vulnerability, capacity and adaptation assessment** includes the range of assessments that can be used to generate policy-relevant evidence on the scale and nature of health risks, and the most vulnerable populations, taking into account the local circumstances. V&A assessments are an important component of developing HNAP and Timor-Leste had completed V&A before start of H-NAP development process.

4. **Integrated risk monitoring and early warning** which refers to the use of early detection tools and epidemiological surveillance used in conjunction with direct and remote sensing technologies for surveillance of environmental determinants of health e.g air and water quality, variability in ambient temperature etc. Such information can be used to develop early warning and response systems that can provide timely warnings to save lives from heat-related illnesses and deaths; extreme events such as floods, droughts, and floods; and vector-borne diseases.

5. **Health and climate research** refers both basic and applied research so as to reduce uncertainty about how local conditions may be affected, gain insight into local solutions and capacities, and build evidence to strengthen decision-making. Significant efforts are needed in Timor-Leste to build the integrated surveillance and monitoring systems that are a foundation for understanding the associations

between weather patterns and climate-sensitive health outcomes, projecting how risks could change with additional climate change, and developing early warning and response systems where possible.

6. **Climate resilient and sustainable technologies and infrastructure** includes ensuring that the siting of health facilities and building codes that are applied account for current and projected future climate risks, and selection of medical technologies and products with lower environmental footprint can also contribute to climate resilience and long term sustainability. Extreme weather and climate events, including floods and droughts, can compromise water availability and safety. Energy access is an important component of maintaining and improving population health.

7. **Management of environmental determinants of health** refers to effective actions that can be taken by health system are in collaboration with other sectors, i.e. through promoting a "Health in all policies" approach. Increasing temperatures and precipitation events can compound the health burdens associated with limited access to safe water and improved sanitation. Other environmental determinants of health where joint action is needed with other ministries and departments is air quality, water quantity and quality, food and nutrition security, and housing.

8. **Climate-informed health programmes** refers to health programming and operations that consider climate risks and vulnerability and increasingly become climate-resilient through assessment, programming and implementation. With climate change increasing the geographic range, seasonality, and incidence of climate-sensitive vector-, food and water-borne diseases in Timor-Leste, health programs need to be modified to explicitly consider what, if any, adjustments are needed to manage the potential impacts of a changing climate. Similarly, adjustments may be needed to programs concerned with maternal and child health, WASH, nutrition, occupational health, emergency management, and mental health.

9. **Emergency preparedness and management** refers to climate informed preparedness plans, emergency systems and community-based disaster and emergency management which are essential for building climate resilience. Timor-Leste frequently experience extreme weather and climate events that can result in disasters because of high underlying geographic and socioeconomic vulnerabilities. Disaster risk management is a priority for Timor-Leste, although the extent to which health systems are integrated into national committees need to strengthen. Hence, further efforts are required to integrate climate change adaptation and disaster risk management programs; doing so can help protect communities in high risk regions.

10. **Climate and health financing which** refers to a comprehensive approach to financing health protection from climate change through funding in health system as well as health determining sectors. Achieving a climate-resilient health system requires additional financing. Health systems do not have the resources to make all the adjustments necessary to increase resilience to a changing climate, such as building integrated surveillance systems that include health and weather data to identify where and when infectious disease outbreaks could occur. Hence, additional investment or funding from external development partners is needed to have the human and financial resources needed to ensure that all the building blocks of health systems are climate resilient.

1.4 Process of H-NAP development

The elements of the H-NAP development process are: lay the groundwork; preparatory elements; implementation strategies; and report, monitor, and review. These are broadly related to the phases of a project cycle (identification, formulation, implementation, and monitoring and evaluation). At the first step, this H-NAP development is aligned with national adaptation process and builds on national adaptation programme of actions, national communication report to UNFCCC, intended national determined contribution to climate change, environmental health strategy of

Ministry of Health and other international commitments made by the country such as Male' declaration 2017.

The HNAP process is embedded within existing national health programmes, rather than as an independent programme. Hence, climate change adaptation policies and programmes are mainstreamed into specific public health programmes such as vector-borne diseases, water-borne diseases, nutrition programmes etc. Therefore, strategies and actions to build resilience through these programmes will be implemented at the respective operational levels.

It was thoroughly reviewed national and sub-national research on the health risks of climate variability and change; knowledge of factors increasing/decreasing vulnerability; adaptation policies and programmes undertaken; and national capacity gaps to undertaking the HNAP. It was felt need of external technical support for undertaking H-NAP development. Hence, upon the request of Ministry of Health, Government of Timor-Leste, WHO provided technical support through international consultant to facilitate H-NAP development process. Based on findings of stocktaking, it was also felt need of conducting comprehensive health vulnerability and adaptation assessments (V&A) to climate change. Therefore, V&A assessment was carried out from May to October 2018. This was carried out in close coordination with all relevant stakeholders organizing inception workshop, individual consultation, visit of health facilities and municipalities and organizing validation workshop.

Based on findings of V &A assessment and review of health implications of climate change, a number of strategies and priority actions were identified organizing inception and validation workshops in March 2019. This step included developing a national goal, strategies and action plan including costing to minimize the adverse health risks of climate change and to build the resilience of the health system. Based on consensus with stakeholders, a five year action plan (2020-2024) is prepared.

2.0 Goal and Strategic Objectives

2.1 Goal

- To protect and promote health of Timorese People in a Healthy Timor-Leste through sustainable and climate resilient programmes

2.2 Strategic objectives

- To reduce burden of climate sensitive vector-borne disease to such as an extent that it is no longer a public health problem
- To reduce morbidity and mortality from water-borne and faecal-orally transmitted diseases through climate resilient water, sanitation and hygiene practices and creating healthy environment
- To reduce health and social burden of food and nutrition related illness
- To reduce morbidity and mortality from air quality related illnesses and diseases
- To reduce heat related illnesses and occupational hazards
- To manage medical waste in an environmental friendly way to protect human health and environment
- To prevent and control NCDs, injuries and mental health illness
- To effectively respond to and minimize health risks form climate induced disasters and emergencies
- To promote healthy and sustainable built environment that creates better environment for healthier life
- To promote green concept in health care facilities (HCF)
- To reduce morbidity and mortality related to climate sensitive diseases and risks through evidence informed decision making
- To ensure sustained financing on health and climate change adaptation and mitigation

3. Strategic Plan

3.1 Strategies and Priority Actions

Based on situation analysis following 12 priority areas were identified and priority actions for next five years were also identified in each priority.

The major strategic objective, priority actions (implementation strategies) and expected outcome of for each thematic areas discussed in situation analysis are presented below

3.1.1 **Vector-borne diseases**

Objective: To reduce burden of climate sensitive vector-borne disease to such as an extent that it is no longer a public health problem

Expected outcome: Morbidity and mortality from vector borne diseases reduced

Implementation strategies:
Vector surveillance and monitoring including risk mapping

Conduct training on climate sensitive vector borne diseases to the communities and carry out advocacy with relevant stakeholders

Train health professionals on diagnosis and management of climate sensitive vector-borne diseases in selected municipalities

Developing models for forecasting and predicting vector-borne diseases such as dengue

Inter-sectoral collaboration and community engagement on control and prevention of climate sensitive vector-borne diseases

Revision of/ updating manual on climate change and health and provide trainings for school students/health professional

Entomological surveys including assessment of insecticide resistance

Establish taskforce for vector-borne or Communicable diseases such as dengue control and prevention

Research on climate change and vector-borne diseases at national and sub-national level and dissemination of findings including advocacy programmes

Sensitize community on common climate sensitive vector-borne diseases for their prevention and control and form volunteer groups (mosquitoes larvae and pupae search and destroy as well as other protective measures)

3.1.2 **Water, Sanitation and Hygiene related diseases**

Objective: To reduce morbidity and mortality from water-borne and faecal-orally transmitted diseases through climate resilient water, sanitation and hygiene practices and creating healthy environment

Expected Outcome: Morbidity and mortality from water borne and water, sanitation and hygiene related diseases reduced

Implementation strategies or priority actions:

Promulgate water supply policy with statement for climate resilient water safety plans (CRWSP), water quality monitoring and water quality surveillance (WQS)

Establish coordination group at MOH to mobilize health promotion team of MOH and volunteers for intensive promotion of sanitation at local level under leadership of Sucos and Adeia

Establish mini-labs in all districts/municipalities for operation monitoring strengthen central DNSA for lab verification monitoring and strengthen central EH lab of MOH for WQ surveillance

Develop climate resilient health care facility standards for adequate water, sanitation and waste management.

Provide water testing kits /portable microbiological systems to all health care facilities

Create awareness and promote advocacy through different media on water, sanitation and hygiene

Build on the previous WSP project in Aileu, Dili, Liquica, Oecusse, and Manatuto and scale up to strengthen the capacity of local authority and water user committees to implement climate resilient water safety plans

3.1.3 **Food security & nutrition related illness**

Objective: To reduce health and social burden of food and nutrition related illness

Expected Outcome: Improved food and Nutritional security

Implementation strategies/priority actions:

Nationwide mapping of vulnerable population of under nutrition

Develop policy, strategy and guideline for monitoring and regulation of the food safety in the country

Strengthen national environmental health laboratories of MOH for food quality testing with mobile facilities for onsite testing

Strengthen capacity of HMIS for reporting food poisoning cases and investigate on food poisoning outbreaks

Carryout nationwide survey on level of contamination of foods in home and market in the country

Development of national standards for food qualities based on research and national survey

Strengthen capacity building at all levels (health staff) on quality control of food and promoting healthier foods

Establish national coordination group among related agencies and partners with representation of consumers, producers and interest groups

IYCF feeding and food supply to pregnant women in areas/groups of high malnutrition

Create awareness and promote advocacy through different media on food safety and nutrition

3.1.4 **Air quality and airborne diseases**

Objective: To reduce morbidity and mortality from climate sensitive and air quality related illnesses and diseases

Expected Outcome: Morbidity and mortality from climate change and air pollution will be reduced

Implementation strategies/priority actions:

Conduct research and studies on climate change, air pollution and respiratory illness (baseline study)

Strengthen early diagnosis and surveillance of respiratory illness such as COPD

Develop national policy and strategy for controlling air pollution including national standards for both indoor and outdoor air quality standards

Promote use of improved cooking stove in the rural community

Awareness raising of solid waste management (domestic waste and industry waste)

Procuring and instalment of air quality monitoring stations in major urban areas of the country and monitoring public transport movement

3.1.5 **Heat related illnesses and occupational hazards**

Objective: To reduce heat related illnesses and occupational hazards

Expected outcome: Occupational hazards and heat related risks and illness prevented and reduced

Implementation strategies/priority actions:

Assessment on heat related illnesses and its effect on vulnerable groups

Capacity building and advocacy trainings on managing health related illness and occupational health hazards

Development of policies and guidelines on heat related illnesses and occupational health

Increase in awareness on heat related illnesses

Develop standards for healthy workplace and guideline in line with Labour Code 2012 and healthy workplace concept of WHO

Intersectoral collaboration and community engagement on minimizing risks of heat stress and occupational health hazards

3.1.6 **Medical Waste Management**

Objective: To manage medical waste in an environmental friendly way to protect human health and environment

Expected Outcome: Health and wellbeing of the population promoted through proper medical waste management

Implementation strategies/priority actions:

Assessment of health care waste management practices in health institutions

Capacity building trainings for implementation of HCW guidelines and procurement of equipments

Implementation of medical waste management in environmental friendly way

Establishment of proper mechanisms for Monitoring and Evaluation of HCW management

- At national level
- At municipality level
- At sucos level

3.1.7 **Non-communicable diseases, Injuries and Mental Health**

Objective: To prevent and control NCDs, injuries and mental illness

Expected Outcome: Improved Health and well-being through promotion of healthy living environment

Implementation strategies/priority actions:
Create awareness on NCDs, mental health issues and prevention of injuries/trauma

Conduct training and advocacy on NCDs and mental health prevention and control

Inter-sectoral collaboration and Community engagement

Strengthen diagnosis, treatment and management of NCDs and mental health disorders

Strengthen Psycho-social Support structure especially climate induced disaster prone areas such as flood and storm affected areas

Introduce Psycho-social counseling and First Aid Network

Implementation of PEN package for major NCDs prevention and control and community level awareness about the package

Training to health professional of climate induced disaster prone areas on Injuries and Trauma management including psychosocial counseling

3.1.9 **Emergency Preparedness and Management**
Objective: To effectively respond to and minimize health risks form climate induced disasters and emergencies

Expected Outcome: Strengthen country capacities to respond to health risks from climate induced disaster and emergencies.

Implementation strategies/priority actions:
Establish a multi-sectoral committee and coordination mechanism at central level

Streamline sectoral emergency plans from different sectors

Endorse national emergency operations and national disaster plan
Update and monitor disaster resources inventory twice a year.

Assess resilience of health facilities to extreme climate events such as floods, landsides, and droughts.

Create disaster management and response plans for health facilities

Conduct awareness and first aid trainings among the communities and professional trainings to health professional about health risks of climate induced extreme events and health management

Regular mock drills/simulation exercise to test current emergency plans

Establish emergency medical team

3.1.10 **Built Environment**

Objective: To promote healthy and sustainable built environment that creates better environment for healthier life and to promote green concept in health care facilities (HCF)

Expected Outcome: Improved Health and well-being of people through promotion of healthy housing and living environment of communities

Implementation strategies/priority actions:
Building outdoor recreational spaces in major urban areas

Develop concepts for green health healthcare facilities

Develop climate resilient health care facility standards for adequate water, sanitation and waste management and Pilot climate-proofing improvements in the selected health facilities.

3.1.11 **Evidence Generation and Advocacy**

Objective: To reduce morbidity and mortality related to climate sensitive diseases and risks through evidence informed decision making

Expected Outcome: Health system strengthened to protect and improve population health in the face of changing climate

Implementation strategies/priority actions:

Conduct national level research study on climate change and health (baseline study)

Establishing technical working groups (TWG) on environmental health including climate and health theme at central and municipality levels

Establishing a coordination mechanism for information and data sharing between the health sector and other relevant sectors

Review and update MOU between various ministries relating to development and sharing of climate change and health required data and joint planning to address health sector climate risks

Enhance statistical capacity within the MOH to determine the exposure-response relationship between climate and health.

Strengthen capacity of MCIE Adaptation Thematic Working Group for data sharing, management, and analysis.

Conduct at least 2 meetings in a year of the environmental health working groups in different level to foster intersectoral collaboration

Conduct annual policy level meeting to foster related policy updates and awareness among Decision makers/ policy makers

Develop and deliver training and advocacy materials on climate change and health.

Conduct public awareness campaigns nationwide to create awareness on health and climate change based on research evidence

Perform municipality-level V&A assessments in the five most vulnerable municipalities identified by the national V&A.

Study the feasibility of an EWS for the top four priority diseases in the national V&A and sharing/disseminating findings to stakeholders

Develop data recording and reporting format/mechanism of climate sensitive diseases and risks and strengthen quality of HMIS and surveillance data

3.1.12 **Climate and Health Financing**

Objective: To ensure sustained financing on health and climate change adaptation and mitigation

Expected Outcome: Ensured Sustainable funding HNAP for implementation

Implementation strategies/priority actions:

Conduct high level advocacy meetings to establish healthcare funds

Identify existing donor funded programmes and map potential donors to approach for future funding on climate change and health

Proposal development for seeking adaptation funds such as from Green Climate Fund

Establish monitoring mechanism to track the financial records and documentations

Integrate climate change aspects into health planning and programs including Five Year Plan

3.2 Management Arrangements for Implementation of the H-NAP

3.2.1 Coordination Framework

Ministry of Health and its department and divisions such as Environmental Health and Sanitation, Communicable Diseases Control, Health Promotion, Surveillance, Nutrition, NCDs etc will coordinate with line Ministries, UN agencies and NGOs to implement this HNAP. Signing memorandum of understanding (MOU) between Ministry of Health and other health determining sectors with specific roles and responsibilities would be preferred. MOH will develop mechanism to ensure the main policies and strategies from health-determining sectors reflect climate change and health considerations both in relation to adaptations and mitigations. Similarly, there will be establishment of a national resource mobilization platform based on national plans of joint action and spearheaded by the national multisectoral health and climate committee (HNAP implementation steering committee).

3.2.2 Implementation Framework

The Ministry of Health will be the national focal point to coordinate implementation, liaise with other units, sections and programs, for timely reporting, monitoring and

evaluation of the HNAP. The details of leading institutes and partner institutes for implementing this HNAP are provided in Annex I. At the ministerial level, the Ministry of Commerce, Industry and Environment (MCIE) has been given a mandate to coordinate climate change related issues. Under MCIE, the NDIEACC has been mandated to address technical coordination for adaptation, including NAPA and NAP. The existing Adaptation Thematic Working Group or Sectoral Working Groups will be utilized to facilitate alignment of HNAP with NAP consultation processes. The existing Interministerial Working Group (led by MCIE) facilitates coordination at political level. In order to implement the HNAP activities effectively steering and technical working group will be formed. The TOR of steering and technical working group will be as follow:

Terms of reference of the HNAP implementation steering committee

The HNAP implementation steering committee have following principal tasks:

- approve the annual work plan and budget;
- provide high-level orientation and guidance;
- ensure the project develops in accordance with national development objectives, goals and polices;
- pay special attention to the assumptions and risks identified during implementation, and seek measures to minimize these threats to the success of the project;
- ensure collaboration between ministries and institutions and free access on the part of project actors to key documents, data and information relevant for the project;
- can modify strategic objectives if deemed necessary during the implementation of HNAP
- pay special attention to the sustainability of activities;
- ensure the integration and coordination of HNAP with overall NAP process in the country

Terms of reference of the HNAP Implementation technical working group

The principal tasks of the technical working group are to:

- coordinate project activities;
- provide technical guidance and support;
- develop project activities;
- advise the implementing units on any HNAP-related issues;

HNAP Steering Committee (SC) will be created to guide the HNAP and act as an advisor to the HNAP management and implementation teams.

3.2.3 Communication Strategy

This H-NAP will be disseminated organizing workshops at national and municipality level. The progress in implementation of the plan will be traced through regular monitoring and evaluation mechanism.

3.3.1 Logical Framework Matrix

The logical framework matrix is provided in Annex I.

3.3.2 Research and Evaluation Agenda

According to logics and previous experiences, immediate results and gradual changes are expected during and after implementing this H-NAP respectively. To obtain the intended outputs, the planned activities have to be implemented using the required resources such as human resource, materials, organizational setup, budget, etc. The outputs in turn also expected to bring intended changes and impacts on community health. Health institutions and the regional health sector will record baseline information on priority climate sensitive diseases, climate variables (rainfall, temperature, humidity, wind), socioeconomic (poverty, demographics and occupation) and current level of interventions and health system capacity prior to starting to adapt climate change effects to measure change after the period of implementation of this H-NAP. The baseline information will be obtained by reviewing documents and/or conducting survey.

3.3.3 Health Indicators

The implementation of HNAP can be measured using following broader indicators

1. Main polices and strategies for climate change, health and health-determining sectors (e.g. water, sanitation and hygiene, food and nutrition, disaster etc.)
2. Percentage of healthcare personnel with information and training to address climate change and health links, appropriate to their role and function (as determined by a survey)
3. Number of climate- sensitive diseases for which there are monitoring systems that are able to forecast and monitor risks and/or to monitor disease risks posed by climate variability and change
4. Percentage of healthcare facilities incorporating climate variability and change in siting, construction, technologies and procedures to ensure provision of basic services (including energy, water and sanitation).
5. Percentage of medium- and long- term plans for control programmes for climate sensitive diseases and emergency management that include consideration of climate change risks.
6. Percentage of the national health budget that addresses risks posed by climate variability and change

3.4 Risk Management Matrix

There should be high willingness and coordination exists between and within relevant agencies to cooperate at national and sub-national levels in order to mitigate the health impacts of climate change.

There should be sufficient capacity and motivation to accurately diagnose disease and to collect and analyze data to strengthen surveillance of climate sensitive diseases.

Communities and healthcare facility operators should be willing to participate in climate-proofing activities and risk mitigation.

In order to reduce costs and to avoid duplication, the HNAP will pursue an active partnership strategy with other ongoing and planned initiatives, as described in Annex I. Based on situation analysis, there is no any risk of implementation of this HNAP as this is align with and guided by existing policies and programmes.

3.5 Costing, Financing and Resource Mobilization Strategy

Since the H-NAP will be mainstreamed to routine activities of the ministry, no need to allocate additional resources for most activities indicated in this adaptation plan. However, there are some funding opportunities like Least Developed Countries Fund, Special Climate Change Fund, Adaptation Fund and Green Climate Fund for health adaptation activities which may have budget scarcity. The budget in deficit to implement HNAP to climate change would be generated from external development partners. Government of Timor-Leste has already secured some funding from Global Environmental Facility for four years (2019-2022). This budget along with regular budget of Government of Timor-Leste, WHO Country Office for Timor-Leste and other UN agencies and NGOs will be major source of budget for implementation of this HNAP. To continue sustainable resource mobilization, grant proposal will be developed and submitted for securing adaptation funds such as green climate fund, SIIDs fund etc.

Annexure I: Plan of Action for Health National Adaptation Plan (H-NAP) with indicative budget (2020-2024)

Expected Result	Planned Activities	Implementing Agency Collaborating partner	Indicator	Budget in thousands (USD)					Total Budget	Funding sources
				2020	2021	2022	2023	2024		
Goal of the HNAP: To protect and promote health of Timorese People in a Healthy Timor-Leste through sustainable and climate resilient programmes										
Strategic Component 1:Vector Borne diseases										
Morbidity and mortality from vector borne diseases reduced	**Objective :** To reduce burden of climate sensitive vector-borne disease to such as an extent that it is no longer a public health problem									
	1. Vector surveillance and monitoring including risk mapping	Lead: Communicable Diseases Control Division Partners: EH Division	Number of surveillance report received	25	25	25	25	25	125	WHO, OGE, GEF
	2.Conduct training on climate sensitive vector borne diseases to the communities and carry out advocacy with relevant stakeholders	Lead: Communicable Diseases Control Department Partner: EHSS Department, Health Promotion Department and National Health Institution	Number of people trained	20	20	20	20	20	100	WHO, OGE, GEF
	3.Train health	Lead:	No. of relevant		20	20	20	20	100	WHO

	professionals on diagnosis and management of climate sensitive vector-borne diseases in selected municipalities	Communicable Diseases Control Department Partner: EHSS Department	officials trained	20						, OGE, GEF
	4.Developing models for forecasting and predicting vector-borne diseases such as dengue	Lead: Epidemiology and Surveillance Department Partners: Communicable Diseases Department ,EHSS Department, TLS Meteorological Services and National Institute of Health	No. of outbreak notification shared/predicted.	20	20	20	20	20	120	WHO , OGE, GEF
	5.Inter-sectoral collaboration and community engagement on control and prevention of climate sensitive vector-borne diseases	Lead: Health Promotion Department Partners: Communicable Diseases Control Department & Environmental Health and Sanitation Department, MOH	No of MOUs signed Number of Community Action Group formed	15	15	15	15	15	75	WHO , OGE, GEF
	6.Revision of/ updating manual on climate	Lead: Environmental Health and Sanitation	Number of manual	30	30	30	30	30	150	WHO ,

	change and health and provide trainings for school students/health professional	Department, MOH	developed and distributed Number of people trained on climate change and health							OGE, GEF
	7. Entomological surveys including assessment of insecticide resistance	Lead: Communicable Diseases Control Department, MOH Partner: EHSS Department	Number of monitoring reports on entomological status and insecticide resistance	40	40	40	40	40	200	WHO, OGE, GEF
	8. Establish taskforce for vector-borne orCommunicable diseases such as dengue control and prevention	Lead: EHSS Department Partners: HEOC, Communicable Diseases Control Department	No of task force committee formed at national and municipalities level	10	10	10	10	10	50	WHO, OGE, GEF
	9.Research on climate change and vector-borne diseases at national and sub-national level and	Lead: INS (National Health Institute) Partners: EHSS Department,	Number of research studied published	50	50	50	50	50	250	WHO, OGE, GEF

	dissemination of findings including advocacy programmes	Communicable Diseases Control Department, MOH	(at least 4 in 5 years)							
	10.Sensitize community on common climate sensitive vector-borne diseases for their prevention and control and form volunteer groups (mosquitoes larvae and pupae search and destroy as well as other protective measures)	Lead: Health Promotion Department Partners: EHSS and h Communicable Diseases Control Department	Number of Community Action Group formed/volunteer group	20	20	20	20	20	100	WHO, OGE, GEF
	Total for Vector-borne , diseases control programme								1270	
Strategic Component 2: Water, Sanitation and Hygiene related diseases										
Morbidity and mortality from water borne and water, sanitation and hygiene related diseases reduced	**Strategic Objective :** • To reduce morbidity and mortality from water-borne and faecal-orally transmitted diseases through climate resilient water, sanitation and hygiene practices and creating healthy environment									
	1.Promulgate water supply policy with	Lead: MOH/EHSS Department and MPW	Formation and approval of policy							WHO,

	statement for climate resilient water safety plans (CRWSP), water quality monitoring and water quality surveillance (WQS)		document on water supply	10	10	10	10	10	50	OGE, GEF
	2.Establish coordination group at MOH to mobilize health promotion team of MOH and volunteers for intensive promotion of sanitation at local level under leadership of Sucos and Adeia	Lead: Health Promotion Department and EHSS Department	Number of group formed % of population covered by health promotion activities	10	10	10	10	10	50	WHO, OGE, GEF
	3.Establish mini-labs in all districts/municipalities for operation monitoring strengthen central DNSA for lab verification monitoring and strengthen central EH lab of MOH for WQ surveillance	Lead: MoH/ MPW	Mini-labs established at municipalities/districts	50	50	20	20	20	160	WHO, OGE, GEF
	4. Develop climate resilient health care facility standards for adequate water,	Lead: EHSS Department	No of health professions trained	40	40	40	40	40	200	WHO, OGE, GEF

	sanitation and waste management.									
	5.Provide water testing kits /portable microbiological systems to all health care facilities	Lead: EHSS Department , MOH	Number of kits provided Number of health care facilities with water testing kits	20	20	20	20	20	120	WHO , OGE, GEF
	6.Create awareness and promote advocacy through different media on water, sanitation and hygiene	Lead: Health Promotion Department, MOH Partner: EHSS Department, MOH	Number of video spots/Audio spots/Social and mass media materials telecasted or broadcasted or delivered to public	10	10	10	10	10	50	WHO , OGE, GEF
	7. Build on the previous WSP project in Aileu, Dili, Liquica, Oecusse, and Manatuto and scale up to strengthen the capacity of local authority and water user committees to implement climate resilient water safety	Lead: EHSS Department, MOH Paprtner: MPW	Number of municipalities having water safety plan	50	25	25	25	25	150	WHO , OGE, GEF

	plans									
	Total for Water, Sanitation and Hygiene								**780**	
Strategic component 3 – Food security & nutrition related illness										
Improved food and Nutritional security	**Strategic objective –** To reduce health and social burden of food and nutrition related illness									
	1. Nationwide mapping of vulnerable population of under nutrition	Lead: Nutrition Department, MOH	Mapping report	50	100	50			200	WHO, OGE, GEF
	2. Develop policy, strategy and guideline for monitoring and regulation of the food safety in the country	Lead: EHSS Department, MOH	Number of policy, strategy and guidelines developed and endorsed	20	30	10			60	WHO, OGE, GEF
	3. Strengthen national environmental health laboratories of MOH for food quality testing with mobile facilities for	Lead: EHSS Department Partner : National Health Laboratory	Number of reports of quality of food tested	40	20	20	20	20	140	WHO, OGE, GEF

	onsite testing									
	4. Strengthen capacity of HMIS for reporting food poisoning cases and investigate on food poisoning outbreaks	Lead: AEFASA Partner : National Health Laboratory	Number of trainings conducted on food inspections	20	20	20	20	20	100	WHO, OGE, GEF
	5. Carryout nationwide survey on level of contamination of foods in home and market in the country	Lead: EHSS Department / AEFASA	Research report	50	50				100	WHO, OGE, GEF
	6. Development of national standards for food qualities based on research and national survey	Lead: MOH	National Standards on Food qualities developed and approved			20	20	10	50	WHO, OGE, GEF
	7. Strengthen capacity building at all levels (health staff) on quality control of	Lead: MOH	Number of training con ducted on food safety	20	20	20	20	20	120	WHO, OGE, GEF

	food and promoting healthier foods		Number of health professionals trained on food safety							
	8. Establish national coordination group among related agencies and partners with representation of consumers, producers and interest groups	Lead: MS EHSS Department	Establishment of multistakeholders working group at MOH	10	10	10	10	10	50	WHO, OGE, GEF
	9. IYCF feeding and food supply to pregnant women in areas/groups of high malnutrition	Lead: Nutrition Department Partner: Health Promotion Department	Number of infant, child and pregnant women distributed with healthy and nutrition foods	20	20	20	20	20	120	WHO, OGE, GEF
	10. Create awareness and promote advocacy through different media	Lead: Nutrition Department Partner: Health Promotion Department	Number of video spots/Audio spots/Social and mass	20	20	20	20	20	120	WHO, OGE, GEF

	on food safety and nutrition		media materials developed							
	Total for Food security & nutrition related illness								1070	
Strategic component 4 –Air quality and airborne diseases										
Morbidity and mortality from climate change and air pollution will be reduced	**Strategic objective – To reduce morbidity and mortality from climate sensitive and air quality related illnesses and diseases**									
	1. Conduct research and studies on climate change, air pollution and respiratory illness (baseline study)	Lead: EHSS Department Partners: Ministry of Environment Ministry of Estatal and Administration, MoH and Sec of State for Environment	Study/research report	50	50				100	WHO, OGE
	2. Strengthen early diagnosis and surveillance of respiratory illness such as COPD	Lead: NCDC Department , MOH	Database of COPD cases	50	50	50	50	50	150	WHO, OGE

	3.Develop national policy and strategy for controlling air pollution including national standards for both indoor and outdoor air quality standards	Lead: MoE	Policy, strategy and standards are developed and approved	30	30	10	10	10	90	WHO, OGE
	4. Promote use of improved cooking stove in the rural community	Lead: MoE	% of households having improved cook stoves in their houses for cooking	100	100	100	100	100	500	WHO, OGE
	5. Awareness raising of solid waste management for reducing ambient pollution (domestic waste and industry waste)	Lead: MoE	Number of awareness raising programme organized or	30	30	10	10	10	90	WHO, OGE
	6 Procuring and Installment of air quality monitoring stations in major urban areas of the country and	Lead: MOE Partners: MOH Sec of State for Environment, MoH, Ministry of	At least five air quality monitoring stations	500	20	20	20	20	130	WHO, OGE

	Monitoring public transport movement	Transport and Communication and Partners	established by 2020 and operational							
	Total for Air quality and airborne diseases								11500	
Strategic Component 5: Heat related illnesses and occupational hazards										
Occupational hazards and heat related risks and illness prevented and reduced.	Strategic Objective: To reduce heat related illnesses and occupational hazards									
	Assessment on heat related illnesses and its effect on vulnerable groups	Lead: SEFOPE Partners: EHSS Department	No of research studies conducted	40	40	20			100	WHO, GEF
	Capacity building and advocacy trainings on managing health related illness and occupational health hazards	Lead: SEFOPE Partners: EHSS Department	No of relevant officials trained	20	20	20	20	20	100	WHO, OGE
	Development of policies and guidelines on heat related illnesses and occupational health and its implementation	Lead: MOH Partner: UN agencies, NGO and Sec of state for emplyment and training	Number of guidelines developed	30	30	30	20	20	130	WHO, OGE, GEF
	Increase in awareness campaign on heat related illnesses	Lead: NCDC Department and Health promotion	Number of Community action group formed	20	20	20	20	20	100	WHO, OGE

		Department	Number of education programs conducted							
	Develop standards for healthy workplace and guideline in line with Labour Code 2012 and healthy workplace concept of WHO	Lead: Directorate of Labour Partner: MOH and Secretary of state for Employment and Training	Formulation and approval of guideline on healthy workplace	50	30	20	20	20	140	WHO, OGE, GEF
	Intersectoral collaboration and community engagement on minimizing risks of heat stress and occupational health hazards	Lead: EHSS Partners: MoEE, MACI	Community action groups, no of MOUs signed.	20	20	20	20	20	100	WHO, OGE, GEF
	Total for Heat related illnesses and occupational hazards								670	
Strategic Component 6:Medical Waste Management										
Health and wellbeing of the population promoted through proper	**Strategic Objective : To manage medical waste in an environmental friendly way to protect human health and environment**									
	1.Assessment of health care waste management practices in health	Lead: EHSS Department Partners: MoE Waste	Number of assessment report prepared	50	50				100	OGE and WHO

medical waste management	institutions	Management Department								
	2.Capacity building trainings for implementation of HCW guidelines and procurement of equipments	Lead: EHSS Department Partners: MoE Waste Management Department	Number of training program conducted	30	30	30	30	30	150	OGE and WHO
	4.Implementation of medical waste management in environmental friendly way	Lead: EH Division	Number of health care facilities practicing HCM in environmental friendly way	50	50	50	50	50	250	OGE and WHO
	7.Establishment of proper mechanisms for Monitoring and Evaluation of HCW management • At national level • At municipality level • At sucos level	Lead: M and E Department	Monitoring and Evaluation report	30	30	30	30	30	150	OGE and WHO
	Total Budget for Medical Waste Management								650	
Strategic area 8 : Non-communicable diseases, Injuries and Mental Health										
Improved Health	**Strategic Objective: To prevent and control NCDs, injuries and mental illness**									

and well-being through Promotion of healthy living environment										
	1.Create awareness on NCDs, mental health issues and prevention of injuries/trauma	Lead: NCDC Department Partners: EHSS Department , HEOC	No. of comprehensive, responsive, quality network of community-based NCDs and MHS networks	30	30	30	30	30	150	OGE and WHO
	2.Conduct training and advocacy on NCDs and mental health prevention and control	Lead: NCDC Department Partners: EHSS Department , HEOC	No. of people trained at atoll level	30	30	30	30	30	150	OGE and WHO
	3.Inter-sectoral collaboration and Community engagement	Lead: NCDC Department Partners: EHSS Department , HEOC	No. of community action groups	20	20	20	20	20	120	OGE and WHO
	4.Stengethen diagnosis, treatment and management of NCDs and mental health disorders	Lead: NCDC Department Partners: EHSS Department , HEOC	Number of health facilities with NCDs and mental health services municipality and sucso level	50	50	50	50	50	250	OGE and WHO

	5.Strengthen Psycho-social Support structure especially climate induced disaster prone areas such as flood and storm affected areas	MOH	Number of facilitators at municipality and sucos level	30	30	30	30	30	150	OGE and WHO
	6.Introduce Psycho-social counseling and First Aid Network	Lead: MOH Partners:	No. of members in network at each municipality	20	20	20	20	20	120	OGE and WHO
	7. Implementation of PEN package for major NCDs prevention and control and community level awareness about the package	Lead: MOH	Population coverage by PEN package programme on NCDs	200	200	200	200	200	1000	OGE and WHO
\]	8. Training to health professional of climate induced disaster prone areas on Injuries and Trauma management including psychosocial counseling	Lead: MOH	Number of health professionals trained in injuries and trauma management	20	20	20	20	20	120	OGE and WHO
	Total budget for								2060	

	NCDs, Injuries and Mental Health									
Strategic Component 9 – Emergency Preparedness and Management										
Strengthen country capacities to respond to health risks from climate induced disaster and emergencies.	**Objective: To effectively respond to and minimize health risks form climate induced disasters and emergencies**									
	1. Establish a multi-sectoral committee and coordination mechanism at central level and municipality level	Lead: HEOC , MOH Partners: MoInterior/Sec state for civil protection, Min of estate and administrative, UN agencies, Timor-Leste Red Cross and Health Professional Association	Number of HEOC estabilished and functioned	10 40	10 20	10 20	102 0	10 20	120	OJE, WHO, GEF
	2. Streamline sectoral emergency plans from different sectors	Lead: HEOC , MOH Partners: Line ministries and relevant partners	Number of sectoral emergency plan streamlined	40	40	40	40	40	200	OJE, WHO, GEF
	3. Endorse national emergency operations and national disaster plan	Lead: MSS Lead by HEOC/MoH, Partners: relevant line ministries and partners	Endorsement of national emergency operation and national disaster plan	10	10	10	10	10	50	OJE, WHO, GEF

	4. Procure equipment and update and monitor disaster resources inventory twice a year.	Lead: HEOC , MOH Partners: relevant line ministries and partners	Inventory of disaster resources	10	10 40	10 40	10 40	10 40	170	OJE, WHO
	5. Assess resilience of health facilities to extreme climate events such as floods, landsides, earthquake and droughts.	Lead: MOH Partners: relevant line ministries and partners	Number of community emergency response forces established	10	10	10	10	10	50	OJE, WHO
	6. Create disaster management and response plans for health facilities	Lead: HEOC , MOH Partners: relevant line ministries and partners	Number of TOT conducted Number of peripheral island covered by TOT	10	10	10	10	10	50	OJE, WHO
	7. Conduct awareness and first aid trainings among the communities and professional trainings to health professional about health risks of climate induced extreme events and	Lead: MOH Partners: relevant line ministries and partners	Number of awareness program conducted at community level on health risks management of climate induced extreme events	25	25	25	25	25	125	WHO, OGE, GEF

	health management									
	Training on health emergency contingency plan	Lead: HEOC, MOH Partners: relevant line ministries and partners	Number of TOT Training on health emergency contingency plan	10	10	10	10	10	50	WHO, OGE, GEF
	8. Regular mock drills/simulation exercise to test current emergency plans	Lead: MoH Partner: Relevant line Ministries	Number of drills conducted	50	50	50	50	50	250	WHO. OGE
	9. Establish emergency medical team	Lead: MoH Partner: Relevant line Ministries	Number of emergency medical teams established	10	10	10	10	10	50	WHO, OGE
	Total budget for Emergency Preparedness and Management								1215	
Strategic Component 10 – Built Environment										
Improved Health and well-being of people through Promotion of healthy housing	**Strategic Objectives** - To promote healthy and sustainable built environment that creates better environment for healthier life - To promote green concept in health care facilities (HCF)									
	1.Building outdoor	Lead: MPW	Number of	50	50	50	50	50	250	OGE

and living environment of communities	recreational spaces in major urban areas		outdoor recreational spaced built for kids, adults, elderly etc. Number of cities where outdoor recreational spaced built for kids, adults, elderly etc.							and WHO
	2. Develop concepts for green health healthcare facilities	Lead: MPW	Number of green health care facilities	20	20	20	20	20	120	OGE and WHO
	3. Develop climate resilient health care facility standards for adequate water, sanitation and waste management and Pilot climate-proofing improvements in the selected health facilities.	Lead: MOH	Formulation of climate resilient health care facility standards Number of health facilities piloted form climate – proofing	30	30	17			77	OGE and WHO

	Total Budget for Built Environment								447		
Strategic Component 11 – Evidence Generation and Advocacy											
Health system strengthened to protect and improve population health in the face of changing climate	Objective: To reduce morbidity and mortality related to climate sensitive diseases and risks through evidence informed decision making										
	1.Conduct national level research study on climate change and health (baseline study)	Lead: MoH National Health Institutions	Number of research conducted on climate change and health	100	100				200	OGE, GEF and WHO	
	2 Establishing technical working groups (TWG) on environmental health including climate and health theme at central and municipality levels	Lead: MoH	Members of Thematic WG Number of TWG formed at central, atoll and community level	5	5	5	5	5	25	OGE, GEF and WHO	
	3. Establishing a coordination mechanism for information and data sharing between the health sector and other relevant sectors	Lead: MoH	Formation of data sharing policy/guideline	5	5	5	5	5	25	OGE, GEF and WHO	

	4. Review and update MOU between various ministries relating to development and sharing of climate change and health required data and joint planning to address health sector climate risks	Lead: MOH	Signed MOU in place	5	5	5	5	5	25	OGE, GEF and WHO
	5. Enhance statistical capacity within the MOH to determine the exposure-response relationship between climate and health.	Lead: MOH	Number of people training on statistical data analysis	20	20	20	20	20	120	OGE, GEF and WHO
	6. Strengthen capacity of MCIE Adaptation Thematic Working Group for data sharing, management, and analysis.	Lead: MOHP	Number of TWG members trained	5	5	5	5	5	25	OGE, GEF and WHO
	7 .Conduct at least 2	Lead: MoH	Number of	5	5	5	5	5	25	OGE,

	meetings in a year of the environmental health working groups in different level to foster intersectoral collaboration		meetings of TWG at each level							GEF and WHO
	7.Conduct annual policy level meeting to foster related policy updates and awareness among Decision makers/ policy makers	Lead: MoH	Number of policy level meetings focused to climate change and health	5	5	5	5	5	25	OGE, GEF and WHO
	8. Develop and deliver training and advocacy materials on climate change and health.	Lead: Health Promotion Department	Training and advocacy materials	20	20	20	20	20	120	OGE, GEF and WHO
	9.Conduct public awareness campaigns nationwide to create awareness on health and climate change based on research	Lead: MoH	Number of nationwide awareness campaign conducted on climate change and health	20	20	20	20	20	120	OGE, GEF and WHO

	evidence									
	10. Perform municipality-level V&A assessments in the five most vulnerable municipalities identified by the national V&A.	Lead: MoH	Number of monitoring reports		25	25	25		75	OGE, GEF and WHO
	11. Study the feasibility of an EWS for the top four priority diseases in the national V&A and sharing/disseminating findings to stakeholders	Lead: MOH	Feasibility study report on EWS Number of people p[participated on dissemination workshop		25	25			50	OGE, GEF and WHO
	12. Develop data recording and reporting format/mechanism of climate sensitive diseases and risks	Lead: M and E Department	Availability of climate sensitive diseases and risks for monitoring trends	25	25	25	25	25	125	OGE, GEF and WH

	and strengthen quality of HMIS and surveillance data									O
	Total budget for Health and Climate Change evidence generation and advocacy								1260	
Strategic Component 12 – Climate and Health Financing										
Ensured Sustainable funding HNAP for implementation	**Objective: To ensure sustained financing on health and climate change adaptation and mitigation**									
	1.Conduct high level advocacy meetings to establish healthcare funds	Lead: MoH Sec of State for Environment, MoH, MoF and Ministry of Foreigners and Cooperation	Establishment of healthcare funds	5	5	5	5	5	25	OGE, GEF and WHO
	2.Identify existing donor funded programmes and map potential donors to approach for future funding on climate change and health	Lead: MOH Partner: MOE Sec of State for Environment and MoH	Inventory of climate financing	5	5	5	5	5	25	OGE, GEF and WHO
	3.Proposal	Lead: MoH/	No of Proposals	25	25	25	25	25	125	OGE

	development for seeking adaptation funds such as from Green Climate Fund		submitted to donors							, GEF and WHO
	5. Establish monitoring mechanism to track the financial records and documentations.	Lead: MoH	Establishment of monitoring mechanism	5	5	5	5	5	25	OGE, GEF and WHO
	Integrate CC aspects into health planning and programs including Five Year Plan	Lead: MOH	Number of policies developed from climate change perspectives	5	5	5	5	5	25	OGE, GEF and WHO
	Total budget for climate change and health financing								225	

Summary of estimated cost for HNAP Implementation (2020-2024)

S.N	Activities	Budget in thosands (US$)
1	Vector borne diseases	1270
2.	Water, Sanitation and Hygiene related diseases	780
3	Food security & nutrition related illness	1070
4	Air quality and airborne diseases	1150
5	Heat related illnesses and occupational hazards	670
6	Medical waste management	650
7	Non-communicable diseases, Injuries and Mental Health	2060
8	Emergency Preparedness and Management	1215
9	Built Environment	447
11	Evidence generation and advocacy	1260
11	Health and climate financing	225
	Total	**10,797**

Annexure II: List of participants of inception and validation workshop on development of H-NAP to Climate Change in Timor-Leste

Date: March 5 and March 8, 2019

No.	Name	Organization	Title
1.	Dra. Odete da Silva Viegas., Dermatologista	MOH	General Directorate for Health Services
2.	Dr. Rajes Pandav	WHO	WHO Representative to Timot-Leste
3.	Luis dos Reis	WHO	WHO Plaining Officer
4.	Jose Moniz	MOH	Chief DVSSA
5.	Martinus Nahak Lino	MoPW/DNSA	Head of Department for for Administrative and programme support
6.	Raimiro Pereira	MEJD	Head of Department School Health

			programme
7.	**Duarte da S. Magno**	**MEJD**	**Technical Support**
8.	**Alda da S. Magno**	**Fisheries, Ministry of Agriculture and fisheries**	**Chief of senior**
9.	**Osorio Belo**	**MoPW/DNGRA**	**Head of Department**
10.	**ISac Fontes P**	**MoPW/DNGRA**	**Head of Department**
11.	**Agostinho Cosme Belo**	**MSS/DNGRD**	**Director**
12.	**Helena G. Pereira**	**MOF/DNMRD**	**Represent of Director**
13.	**Nelson Madeira**	**SEA/DNAC**	**Head of Department for Climate Change**
14.	**Martinho Fatima**	**MSS/NDRMD**	**Head of Department for Disaster Operation Centre**
15.	**Severino D.C. Oliveira**	**MSS/NDRMD**	**Technician analysis**

16.	**Nelson da C. da Silva**	**MOP/DNSB**	**Head Departement for Basic Sanitation**
17.	**Carlitos C. Freitas**	**MOH/DNPC**	**Head of Department for M & E**
18.	**Aderito Claudio**	**MOH/DNPC**	**Programme official**
19.	**Apolinario Guterres**	**MOH/DNPC**	**Programme official**
20.	**Rui dos Reis Pires**	**SEA/ Biodivesrsidade**	**National Director for Biodiversity**
21.	**Maria A. V. Niha**	**MOH/DNSP**	**Head of Department for Surveillance and Epidemiology**
22.	**Dr.Olinda dos Reis Albino**	**MOH/DNSP**	**Head of Nutrition Department**
23.	**Dr. Meghnath Dimal**	**WHO**	**Consultant**
24.	**Dr. Madira Lamichhane Dhimal**	**Freelance**	**Consultant**
25.	**Leoneto S. Pinto**	**WHO**	**NPO-NCD**

26.	**Bendonina De J.**	**MOH/DNSP**	**Environmental Health Officer**
27.	**Evangelita Pereira**	**World Vision TL**	**MCHN Specialist**
28.	**Domingos M.Biak**	**World Vision TL**	**Liaison Officer**
29.	**Jonia da Cruz**	**UNICEF**	**Health Officer**
30.	**Cesaltina pinto Soares**	**MOH/DNSP**	**IHR/POE**
31.	**Tito de Aquino**	**WHO**	
32.	**Costodia B.Florida**	**MOH/Hospitalar**	**Head of Department for ERM**
33.	**Alex Santos**	**PLAN PITL**	**WASH Officer**
34.	**Jose Amaral**	**Water Aid**	**Programme Officer**
35.	**Florentino S.**	**Timor-Aid**	**Director**
36.	**Imaculada Belo**	**WHO**	**Nutrition Oficial**
37.	**Anthony Draper**	**MOH/DNSP**	**Strong TL/Epidemiology Surveillance**

38.	**Agostinho de Oliveira**	**MOH/DNSP-DVSSA**	**WASH officer**
39.	**Rita Maria Soares**	**MOH/DNSP-PES**	**Schools health officer**
40.	**Paulo da Costa**	**MOH/DNSP-DVSSA**	**Administrative officer**
41.	**Eva Magno**	**MOH/DNSP-DVSSA**	**WSP Assistance**
42.	**Silvano Branco**	**INGO Plan**	**WASH Project Assistant**
43.	**Serpa Pinto Rocha**	**Mercy Corps**	**Nutrition & BC Specialist**
44.	**Octavio Pinto**	**MOH/DNSP-DVSSA**	**Vector Control officer**
45.	**Justina Pinto**	**MOH/DNSP-DVSSA**	**Food safety and climate change officer**
46.	**Martinha R. Salu**	**MOH/DNSP-DVSSA**	**Technical officer for Environmental Health programme**

47.	**Dr. Lucio B.Soares**	**MoH/DGPS**	**Health Adviser**
48.	**Georgino J.S.Sarmento**	**MoH/DGPS**	**Staff**
49.	**Carla da C.F.Trindade**	**MOH/DGPS**	**Staff**