



Lao People Democratic Republic
Peace Independence Democracy Unity Prosperity

Ministry of Health

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Part 1
Introduction

The scientists certified that the world climate has been changed and trend to be very complicated, which observe from the increasing of the average temperature and frequently severe natural disaster e.g. storms, flooding and drought¹.

The climate change caused changing of the ecosystems which impact to the human livelihood and health. Climate condition is the key factor of many diseases caused by insects, influenza and water borne disease expansion. Climate change is direct and indirect impacts to the human health. Human faced on the direct impact from climate change such as: Temperature, Raining, Sea level increasing and the frequency of severe weather increasing. For the indirect impacts are the changing of the water quality, air quality, food, ecological system, agriculture and industry, settlement and economic. The direct and indirect exposures could be cause illness, disability and death. Health problem causes increasing the weakness and reduce the strength of individual and group of people that adapt to the climate change. The occurred evidences of climate change to human health (IPCC 2007) exposed that the climate change also change the disease vectors, Infectious diseases, changes in the distribution of some varieties of the flowers that causing some allergic reactions and increasing the heat wave associated with the dead. Therefore, the necessity is required and cope with uncertainties of the climate change impacts without any options.

In recent century, Lao PDR has been one of many countries facing on climate change issues which influence to the overall health problems. The phenomenon of the climate change such as flooding and drought have a high impact to the national economic, including health of the people².

Part 2

Climate Change Condition and Health Impacts

2.1 Worldwide climate change

Climate change assessment report version No. 4 of international experts on climate change at the end of 2017 indicated that the world temperature to increase from 1,1-6,4 degree Celsius in the last decade of 21st century if there are no any necessary measurements to prevent the temperature increasing.

For South East Asia region indicated that heat level in this area will change similar to the worldwide average changing, including the 7% raining increase per annum in the region, temperature, heat and raining were increased the severity and frequency. The key affected fields from climate change described as follow:

- Water resource: It is expected to be reduce 10-30%, some areas that impacted from the drought intend to be increase and wider expansion. Besides that, there will be the severe and frequent raining which lead the flooding increase.
- Ecosystem: The increasing of world average temperature is higher than 1.5-2.5 degree Celsius caused a big changing in structure and functioning of many ecosystems, there will be change the relationship between varieties and species distribution which cause negative impacts to the biodiversity and ecosystem.
- Agricultural products: It is expected to be reduce whenever temperature increased 1-2 degree Celsius i.e. the bottom line of the world especially in the drought and seasonal hot climate areas.

As above impacts, many poorest countries and communities will have more impacts than the others due to the landscape, low income and the organizational adaptation capacities still being low¹.

2.2 Climate Change condition and impacts in Lao PDR.

Refer to the WHO's climate change and health report for Lao PDR 2015 described that:

2.2.1 Annual average temperature

If there are high gas emission, the annual average temperature expected to increase approximately 4.6 degree Celsius from 1990 – 2100. If the gas emission reduces rapidly, the annual average temperature will rank at 1.4 degree Celsius and expected that the annual average temperature will be increase more in the southern part⁴.

2.2.2 Heat wave

If there are high gas emission, the number of heat wave days expected to increase from below 10 days in 1990 until average 170 days in 2100. The death of elders (+65 years) also expected to increase 72 of 100,000 people in 2080 compare to the basic information 03 of 100,000 people per year from 1961 – 1990. If the gas emission reduces rapidly, the number of heat wave days will have limited average 50 days. The death of elders from heat wave 15 of 100,000 people in 2080³. Heat waves also impact to the health cause the illness especially chronic respiratory illness and blood vessel. Children, elders, workers who working outdoor and people who have chronic disease are the riskiest group when the heat wave occurred⁴.

2.2.3 Health impact from severe weather

Climate change expected to increase the risky and severity of drought and flooding in Lao PDR. As the existing sensitivities such as low nutrition, weak health care service and low climate change adaptation capacity. Lao PDR has a high risk to the health impacts from the drought and flooding⁴.

2.2.3.1 The exposure of flooding

From 1966 – 2009, Lao PDR faced on the average 36 flooding times per annum. If there are high gas emission release, the number of severe raining days (20mm or more) be able to increase in average 08 days from 1990 – 2100 which also increase the risk on flooding. If the gas emission reduces rapidly, the risk on flooding will also have a rapid reduce³. The climate change is also the major cause of the increasing the annual average raining in rainy season which associated to the increasing of flooding include longer dry season⁴.

It is expected that Lao PDR in 2030, there will be 40,400 people face on the increasing of flooding risk which was the impacts from climate change and 27,800 people from the changing on social-economic which higher than estimation number of 48,200 people each year that to be impact in 2013³. Many districts of Savannakhet and Luangprabang expected to be risk to flood. For other provinces also risk on highest flooding such as Houaphan, Khammouane, Luangnamtha, Saravanh, Sekhong and Vientiane provinces⁴. Flooding are the direct and indirect impact to the health. The direct impacts are sinking, impacts, housing and healthcare facilities were damaged. For the indirect impacts are the increasing of water borne diseases (e.g. E-Coli, Sunmonanla that causes Diarrhea) because the spread of germs from the stool in the area, the water and sanitation systems still not cleaned and safe. Beside that the Melioidosis and Leptospirosis diseases which is local diseases, there might be outbreak in the rainy season and highest risk if the flooding increased. The other impacts from flooding are skin diseases, muscles and respiratory infections⁴.

2.2.3.2 The exposure of drought

If there are high gas emission, the number of drought days intend to be longest which will be increase average 10 days from 55 days in 1990 by continue changing year by year. If the gas emission reduces rapidly, the increasing of the drought will be limited lower than average 1.5 days³. Drought impacts to the quantity and safety of the water and sanitation system which causing the risk of water borne disease. The quantity of crops and domestic animals reduced and damaged that willing affected to the food security and increase the risk to malnutrition⁴.

2.2.4 Disease caused by insects

People who risk to the Malaria expected to be reduce until 2070. However, it is expected that if there are low gas emission, risk people will drop down significantly 1.6 million people each year. In 2070, if there are high gas emission, approximately 1.9 million people will be risk to Malaria each year³.

2.2.4.1 Dengue fever

The increasing of temperature increases the geographical areas of the dengue spreading. The studies in Yangon and Singapore indicated that the humidity and temperature increasing in rainy season will lead to good conditions for dengue. In Lao PDR, there are 8% death causing from dengue and still being the key issue of the public health. Recent years, there are severe epidemic of the dengue, in 2006 the infection rate is 96.9/100,000 people. In 2010, there are 22,890 dengue cases. In 2013, there are 44,171 cases, died 95 people. Mostly, dengue occurred in rainy season from May to October. Usually, dengue occurred in the urban area and people who living in each province. But in 2009 found that the dengue occurred significantly in rural of Lao PDR. The climate change associated to the temperature and raining increasing be able to causes the dengue spreading. The only one degree Celsius of temperature increased, the average temperature can cause increasing of the dengue cases in the world⁴.

The studies found that, dengue cases are high in rainy season. But the spreading has changed according to the part and there is significant influence on the average temperature of the landscape, raining and humidity overall the country, northern and middle parts².

2.2.4.2 Malaria

Refer to the information of World Health Organization published in 2014 regarding to the Malaria in Lao PDR exposed the following statistics like: 31% of people living in area with high Malaria more than 01 cases/1,000 people. 61% of people living in the area with low Malaria 0-1 cases/1,000 people and 7% of people living in Malaria free area. The main Malaria found are *P. falciparum* and *P. vivax* which covered 62% and 38% respectively. Due to there are policies and strategies for Malaria controlling in Lao PDR, people at risk of malaria are expected to drop down in 2070. However, Malaria is also still being a cause of the illness and death of the Lao people. 70% of the population is still in the risk of Malaria.

2.2.4.3 Other diseases

Other disease caused by insects may increase the risk of climate change in Lao PDR. There are Zika virus and chikungunya include Japanese Encephalitis.

2.2.5 Nutrition

In Lao PDR, the nutritional status is a primary health problem. In 2010, children under 5 years old are 43.8% short, 26.5% low weight and 6.4% thin respectively. When climate change, elevated temperatures, water and housing scarcity, floods, droughts and migration, the negative impacts on agricultural production and the destruction of food production systems. These disparities will lead the situation worse in the Lao PDR especially it will be the most impact to vulnerable groups, which may be at risk of hunger and unstable food insecurity issues and there may be potential risk of food reduction and nutritional problems if there is the exposure of the severe weather³. In addition, the education also shows that storm affected people have an important association in severe nutritional deficiencies.

2.2.6 Water borne diseases

Severe weather and climate change are two main causes of water borne disease. Diarrhea is the cause of death of the world after natural disaster, especially children under 5 years old. In Lao PDR, due to there are combination between sanitation behavior and the prediction of raining and drought increasing. It is expected that the risk to diarrhea will be also increase. Based on the result of the public health sensitivity evaluation that implement by Health and Hygiene Promotion Department and WHO 2010, the rate of diarrhea is very high in the dry season, but the proportion of food poisoning and typhoid fever intend to be increase during the rainy season. The risk of these conditions is expected to be increase in the Lao PDR due to climate change⁴.

The research also found that dysentery disease relates to the average temperature in the national level, northern and southern parts. There is a significant relationship with spatial temperatures across the country and associated with rainy season in the northern part. In case of hepatitis is only related to moisture in the northern part. For the epidemic of Typhoid fever that very high in rainy season and there is a correlation between typhoid fever and average temperature, rainfall and humidity at the national level, northern and central parts, but in the southern part, there are no interrelations².

2.2.7 Parasites

In Lao PDR, almost 50% of people risk to the parasite infection. In 2012, only 59% of those at risk were treated. The Soil transmitted helminthiasis (STHs) is a common disease in poor countries. Children are more likely to suffer from the disease that resulting to the malnutrition, thin and short. The research indicated that, during 2000-2002, the prevalence of

parasite infection in children is 61.9%. During 2007 – 2011, the percentage is increased to 71.9%. Overall, 10 million people in Lao PDR and Thailand are infected with parasites.

Present time, parasite infection is the forgotten disease include Hemorrhoids in the liver that caused from foodborne liver flukes i.e. *Opisthorchis viverrini*, *Opisthorchis felinus* and *Clonorchis sinensis*. These diseases often occur among rural people living in low-income areas. A reason for the high prevalence of this disease in Lao PDR due to the consumption of raw fish. These fish are the habitat of the Hemorrhoids in the liver, especially in the area near the Mekong river⁴.

The research on avian influenza has been linked to the production of cercariae germ in the snail and the temperature increasing. Infection with other parasites found in Lao PDR is schistosomiasis, trichinella, lymphatic filariasis.

2.2.8 Mother and children health

Climate change is one of the greatest obstacles for achieving the sustainable development goals in improving women's health. Severe weather reduces the risk of access into the clean water and causing diarrhea outbreak. Lacking of water during women's diarrhea affects to the health of newborn babies. In Lao PDR, the mortality rate of women is still being high in the Southeast Asian region. In 2015, maternal mortality is 206 per 100,000 live births. The illness caused by malaria, dengue and hemorrhagic fever, which is a local disease has a direct bearing on women's health and it is expected to increase due to climate change. The study on the fever of Lao pregnant women found that some infectious diseases going to strong in pregnant period including the severe weather sensitive diseases such as *P. falciparum*, *Listeria monocytogenes*, Hepatitis E virus (HEV), and the influenza virus. In pregnant women, the infection of *P. falciparum* and *P. vivax* related to the mortality of women, children who is premature birth and under weight babies. In the area existed the local diseases of Lao PDR, the malaria infectious of women causes new born babies are under weight, residual cord and severe anemia.

2.2.9 Respiratory diseases

Respiratory infection is going to be severe if the temperature increased. The studies in Asia and the world indicated that the allergens from the flower pollen has increased from the carbon dioxide concentration increasing. The increasing of the flower pollen related to the respiratory diseases patients in the hospital increased, inflammatory from allergies. The drought weather related to the dust increasing, flower pollen and other particles such as the fungi if the fungus in the air which risk to the Asthma and severe respiratory infections increased.

In Lao PDR, the key mortality causes in the hospital that reported in 2010-2011 is severe respiratory infection which 49% is the children under 05 years old. Lung infection is the mortality cause of the baby after born which covered 29%

In Lao PDR, 03 key factors that causes disease are the pollution in the building/house which causes from utilize the firewood for cooking, smoking and risk on food. The cause of lung infection in Lao PDR still not clear. However, the rhinovirus and human respiratory syncytial virus (HRSV) is the big cause of severe respiratory infection.

The study explained that people who stay inside the building/house that consist the wet weather condition could be the asthma, cough, wheezing, pneumonia and other respiratory infections. These issues going to be the Lao PDR problems that expected to be more flooding which will also more increase the respiratory infections. The flooding is not only increase the fungus in the flooded areas, but also limited the accessibility of the healthcare service and other medical instruments.

2.2.10 Mental illness

Climate change direct and indirect impact to the mental illness. The direct impact has a stress from previous severe weather and the indirect impact came from the resettlement, lost income, lost the housing. The study explained that the heat waves are associated with increased hospitalization of people with mental illness. The study also indicates that, the stress of heat from the occupation lead to the mental illness in workers. People who faced on disaster issue will be at risk for a stress and depression from the impacts. The depression is mostly expected to be occur to the people who living in the urban areas.

The study also found the association between the ruins of the crops and the suicide of the farmers from the drought. The ruin of the crops impact to the livelihood of the farmers and community economic. Long term drought resulting to the individual and family resettlements to seek better opportunities.

For Lao PDR, the most workers working on the agriculture which exposed to the sunlight and potential lead to be stress from the heat of their occupation and might be increase of the mental illness. Long term drought in agricultural sectors direct impact to the economic that potential negative impacts to the community and reduce the capacity of personal healthcare due to limited budget.

In addition, mental health services in Lao PDR is still very limited due to there are only 02 mental illness experts, 01 nerve experts, 08 general doctors, 05 assistant doctors and 21 nurses responsible the mental illness whole country. There are less mental illness data and public health system still lacking of the capacity to manage the mental illness increasing that might be cause from the climate changes. In addition, drought and flooding also causes more mental illness due to lost of housing, occupation and family resettlement.

2.2.11 Conclusion of Health impacts from climate change in Lao PDR

The review meeting focus on the possible health impacts from climate change in Lao PDR as below:

1. Insecticide disease: Malaria, Dengue, other disease from mosquito such as Japanese meningitis, chikungunya and zika virus
2. Disease associated with water supply, sanitation and inadequate hygiene such as diarrhea and soil-transmitted helminth infections
3. Health impact from severe weather
4. Respiratory diseases
5. Non communicable diseases
6. Malnutrition and food securities
7. Reproductivities and women's health
8. Mental illness

2.3 The responses to the climate change in Lao PDR

Regarding the meaning and significance of climate change issues, many countries in the world, region and Lao PRD has to pay more attention to the cooperation and support together on climate changes, which coverage two parts such as the climate change adaptation and greenhouse gas reduction. These activities requested to pay more attention at the national level capacity building on planning and implementation any activities as appropriately. In form of the coordination and wide implementation¹ Ministries and related departments also create the strategies and planning to prepare the response and restore the challenges from climate changes such as:

1. National adaptation plan 2009
2. Climate change strategies in Lao PDR 2010
3. Climate change plan in Lao PDR 2013-2020

2.4 Pending issues and challenges related to the climate change adaptation

1. Lacking of information

- Lacking of reliable information on climate change and health impacts to develop the adaptation plan of public health sectors e.g. the estimates information of parasite distribution.
- There is no information on impacts from climate change and environment associate the insects and hosts, social-economic factors include the adaptation of population to the climate change.
- Trend estimation form of disease distribution in each province, district and village from the climate change.
- There is no information on air pollution outside the buildings.
- There is no information on drought and underground water.
- There is no information on mortality that refer to the death certificate. Mostly the death information came from the hospital.

2. Limited capacity

- Knowledge, experience and capacities associated to the climate change adaptation of the related ministries and communities included knowledge and experience on monitoring, Surveillance, controls, protection, diagnosis and climate sensitivity and risky factors management are still limited.

3. Social-economic factors and adaptation capacities

- Poverty rate still high
- Education level still low
- The daily living still high consumption of the natural resources
- The health service accessibility still limited
- The accessibility of water, sanitation of individual, family and community to response to the climate change still limited.

4. The challenges in rural area

- The accommodation in urban has a high risk to the climate change that related to the health such as limited accessibilities of health service and natural resources, in the northern part, the house construction still not stable, remoted and accessibility of road, foods, clean water and sanitation still limited and the daily living still high consume of the natural resources

Part 3

Vision, Mission, Overall Target and Guideline

3.1 Vision:

- People are healthy and strong

3.2 Mission:

- In order for people to be their own healthcare, strong, resistant to climate change by disease protection service, treatment and improve quality through a sustainable healthcare system.

3.3 Overall target:

- To promote the capacity of the public health and community sectors to prevent and protect the health of people from unstable and changing climate conditions.

3.4 Guideline:

National adaptation strategy of public health sector to the climate change from 2018-2025 consist of 06 strategic directions that complied with the sixth 05 years national social-economic development plan (2016-2020) and move step forward into the implementation of sustainable development goals successfully.

- Any activities should be supported by the partners at national, provincial and local levels.
- Activities should be sustainable and built in an existing framework.
- Based on a combination of knowledge and experience in policy and practice.
- Networks and partners are the best mechanisms to use the limited resources to be the most useful and provide the equality access to the products at national, provincial and local levels; And facilitating the implementation of the strategies.
- Consultation, coordination and support from state agencies include donors are the significant key successful.
- The distribution of power, planning from bottom to top, should be supported by increasing the local practices.
- Local capacities, communities and disadvantaged groups play an important role in planning and implementation making decisions.
- Every activity should have the sustainable in environment.
- Promote and support gender in all activities is active at each level and in each sector.

Part 4

Main strategies and Components

The national adaptation strategy of public health sector to the climate change has developed in accordance to the operational framework for building climate resilience health systems) of WHO, 2015 which consist of 06 strategic directions and 10 components below:

1. Strategic direction 1: Leadership status and Governance

1.1. Component 1: Leadership status and Governance

2. Strategic direction 2: Organizational and staff capacities strengthening.

2.1. Component 2: Organizational and staff capacities strengthening.

3. Strategic direction 3: Information systems

3.1. Component 3: Sensitivities, Capacities and Adaptation assessments.

3.2. Component 4: Integration of risk monitoring and warning systems.

3.3. Component 5: The studies on climate change and health.

4. Strategic direction 4: Resilience to the climate change conditions and the sustainability of Technology and infrastructure.

4.1. Component 6: Resilience to the climate change conditions and the sustainability of Technology and infrastructure

5. Strategic direction 5: Service Providing

5.1. Component 7: Environmental Health Impacts Factor Management.

5.2. Component 8: Developing a public health plan from climate change information on

5.3. Component 9: Emergencies preparation and management

6. Strategic direction 6: Public health finance and climate change

6.1. Component 10: Public health finance and climate change

The detail of each components exposed as below:

4.1 Component 1: Leadership and governance

The strategic direction is to set up the Public Health Adaptation Committees on climate change and identify roles and responsibilities, as well as the coordination mechanisms, from central to local levels, and collaborate with the relevant departments to deal with potentially harmful health risks from climate change.

Objective:

1. To establish an organization responsible for the adaptation of the health sector to climate change and identify the roles and responsibilities, as well as the coordination mechanism in the Ministry of Health clearly.
2. To ensure that climate change and health have been incorporated into health strategic plans.
3. To enhance the relationship strengthening, cooperate with the sectors and the relevant departments
4. To ensure that the judgments are carried out within and outside the Ministry of Health to prevent and protect the health of the people from climate change.

Main Activities	Outputs	Outcomes
<ol style="list-style-type: none"> 1. Establish committees, units and national coordinators for the adaptation of health sector to the climate change, from the central to local levels, include defining the roles and responsibilities of each party to be clear. 2. Establish a team with staff and office equipment adequately 3. Identify the coordination mechanism and report to the related departments and sectors 4. Hold the meetings with relevant departments and sectors to sign a Memorandum of Understanding between the Ministry of Health and core partners 5. Review the development project that still not making the health impact assessment reports and implement health impact assessments for the relevant policies, programs and new projects of the relevant sectors. 	<ol style="list-style-type: none"> 1. National Advisory Committee, units and coordinators for adaptation of the public health sector to the climate change, from central to local level has established at the end of 2017 and there are some movement 2. Units and coordinators have worked closely with programs that are sensitive to the climate change, such as disease caused by insects, waterborne diseases, nutrition, infections, risk mitigation from disasters, etc. 3. Memorandum of Understanding between Ministry of Health and key partners (Department of Meteorology, Ministry of Water Resources and Environment, Ministry of Agriculture and Forestry, Ministry of Energy and Mines, Ministry of Public Works and Transportation). 4. Major development projects, such as hydropower dams, mining, access roads, agriculture and the establishment of a special economic zone, have to produce the reports on 	<ol style="list-style-type: none"> 1. The Public Health Sector Adaptation Sub-plan on Climate Change is located within the Ministry of Health working plan 2. The climate change and health works is in the policies / strategies of the relevant sectors.

Main Activities	Outputs	Outcomes
6. Participate the world-class, regional and national seminars on climate change and health.	health impact assessment and public health management and monitoring plans. 5. Representatives of the Ministry of Health attended the Global, Regional and National Climate Change Conference such as UNFCCC, Conference of the Parties (COP), NAP, national communications to the UNFCCC	

4.2 Component 2: Organizational and staff capacity strengthening

This strategic direction is to strengthening the organization and enhance the knowledge, skills and experience of staff at each level to provide adequate knowledge, including adequate staffing to prepare and respond to the emergencies, especially in the sensitive communities, to be ready to respond to climate change by themselves.

Objective:

1. To ensure that there are health workers have sufficient technical capacity to cope the health risks from the climate change.
2. To upgrade the knowledge capacity building of relevant organizations
3. To enhance the awareness and communication on climate change and health impacts to be higher.

Main activities	Outputs	Outcomes
<ol style="list-style-type: none"> 1. Training the target staff (internal and external of the Ministry of Health) about climate change and health 2. Establish the training courses on climate change and health at the National University and the University of Medical Science. 3. Develop / update on diagnostic, investigation, control, prevention and treatment (dengue, diarrhea, typhoid, urinary diseases), injuries and diseases caused by food. 4. Establish a communication strategic plan related to climate change and health (such as preparing, printing and distributing health educational advertising tools, television shows, and radios that expose the impacts of climate change and proper response, preventive measures at high / 	<ol style="list-style-type: none"> 1. Training the target staff on climate change and health has been implemented 2. Standard working procedures and guidelines for staff who working with the diagnosis, reporting and related investigations to diseases that are sensitive to the climate change are endorsed by relevant parties. 3. Teaching and training courses on climate change and health at the 	<ol style="list-style-type: none"> 1. Knowledge and capacity of health workers has been upgraded adequately to deal with health effects from climate change. 2. People have a good knowledge and understanding of the health problems associated with the

Main activities	Outputs	Outcomes
<p>low temperature, in the event of floods and droughts and other measures to prevent diseases that are sensitive to the climate change, particular attention should be paid especially to the disadvantaged groups (elderly, children, women, and the areas with high risk to the epidemics).</p> <p>5. Develop a gender dimension plan that related to the climate change and health</p>	<p>National University and University of Medical Science have been created and endorsed by the Dean of the university and conduct the teaching regularly</p>	<p>climate change.</p>

4.3 Component 3: The estimation of sensitivities, capacities and adaptation

This component is a range of the assessments that will bring the impact of the assessment to use for generate evidence on the size and nature of health risk assessments for making decision and identify the most disadvantaged population in terms of local climate and health conditions.

Objective:

1. To ensure that there is a basic understanding of the health risks that caused by climate change and the most disadvantaged population whole country.
2. To ensure that the basic information on capacity and vulnerability is collected to analyze and develop an adaptation plans to the climate change appropriately.
3. To summarize the basics information for the main options on adaptation, including the comparison the obtained benefits, the efficiency and the potential costs to the top level.

Main activities	Outputs	Outcomes
<ol style="list-style-type: none"> 1. Identify the most disadvantaged communities for fluctuations and changes in climatic conditions and related health risks by existing data. 2. Assess the ability of the health system to cope with health risks from climate change and develop plans to take appropriate actions (such as diagnostic and therapeutic capabilities, clinics, etc.) 3. Hold meetings with the Environmental and Social Impact 	<ol style="list-style-type: none"> 1. The basic rates and public health conditions that are sensitive to climatic conditions and continuous monitoring of risk factors and public health conditions have been assessed. 2. The most disadvantaged and risk areas of climate change are identified. 3. A Health Impact Assessment for Health Adaptation Policies and mitigation to health of 	<ol style="list-style-type: none"> 1. Disadvantaged communities are identified in the list, prioritized and created the maps by using GIS 2. The disadvantageous

Main activities	Outputs	Outcomes
<p>Assessment Department and other relevant departments on integrating health impact assessments into all development projects.</p> <ol style="list-style-type: none"> 4. Assess health structures at all levels (especially disasters area) to response to diseases that are sensitive to climatic conditions (dengue, diarrhea, typhoid fever, urinary disease). 5. Operate after a severe weather event / assess the damage caused by disasters and disseminate peasants for affected populations, Considering the disease that is sensitive to the climate and mental illness 6. Develop project proposals, recommendations and strategies for adjusting the identified defections. 7. Analyze climatic conditions, diseases and other relevant data / parameters (exposure, adaptability) 8. Develop community capacities by creating activities with adaptive measures in the identified disadvantaged communities. 	<p>relevant sectors have been implemented.</p> <ol style="list-style-type: none"> 4. The availability of existing data on resources and the ability to provide health and technical services is identified, including the outstanding issues. 5. Guideline on how to deal with outstanding issues, including the ability of the health system, has been upgraded. 6. The results of the assessment were used to identify the priorities of resources allocation and effective implementation in the health sector and other relevant sectors for high-risk areas and disadvantaged population groups. 7. Plans and mechanisms have been created for a revision of adaptive and defective options 	<p>part of the health system towards climate change is set in the list and created the maps</p> <ol style="list-style-type: none"> 3. Proposals and adaptation plans are ready to be implemented 4. Vulnerable communities in the map have the ability to adapt 5. Climate change sensitivity disease have been dropped down

4.4 Component 4: The integrations of risk and warning system monitoring

This component means creating an overview of health risks with clear and credible information, which can be used to design an early warning system to predict and warn health officers and the public that emergencies occur quickly such as severe weather events or epidemics associated with the expected climate to be occur.

Objective:

1. To collect, analyze and translate environmental risk information that sensitive to climate change and epidemiology trends in order to respond to the risks in a timely manner.
2. To compile and disseminate information on the climate change impact, vulnerability, responsiveness and the ability to prepare for emergencies.
3. To communicate a warning system to public health director, journalists, public in timely manner to ensure that there is appropriate measurement to prevent health impacts from climate change.
4. To strengthen the information system in detecting the diseases and climate risk extremes quickly and to initiate a first resolution.

Main activities	Outputs	Outcomes
<ol style="list-style-type: none"> 1. Collect and analyze data of some key variables (such as extreme temperatures, rainfall, humidity, illness and death from diseases that are sensitive to climate change) that are related to communicable diseases, insects, and other hazards. 2. Create and test website reporting system for the symptoms, laboratory and environmental-hygiene aspects of diseases that are sensitive to the climatic conditions. 3. Provide strong support for disease surveillance, reporting, monitoring and control activity and mitigation of diseases caused by insects and pests. 4. Track the early warning systems by using mosquitos and weather forecast data 	<ol style="list-style-type: none"> 1. Risks associated with climate change conditions and continuing health impacts have been continuously monitored. 2. Upgrade the health system's ability to prevent and mitigate the impacts has been ongoing. 3. The convert of the analyzed data has been regularly reported for making decision 	<ol style="list-style-type: none"> 1. The information system for detecting diseases and quick climatic conditions risks and prior resolve is strengthened. 2. Evaluation guideline has been established 3. Early warning system pilot projects based on climatic conditions for the outbreak of dengue fever were conducted. 4. Insecticide disease associated with climatic conditions are controlled

4.5 Component 5: The studies on climate change and health

This component is fundamental to building the resilience to climate change, which requires basic research and the utilization of research results to determine that the local environment is potential impact by climate change and to understand the problem-solving direction and local capacities, including evidence-based making decision.

Objective:

1. To promote the using of disease surveillance data to make understanding the human health defects to the climate change.
2. To ensure that the research involving a variety of climate change and health sectors is identified and endorsed by the Partnership and Adaptation Committee of the Public Health Sector against climate change,
3. To ensure that healthcare policy maker and Public Health Steering Committee are utilizing the research result on climate change and health for decision-making.

Main activities	Outputs	Outcomes
<ol style="list-style-type: none"> 1. Hold a meeting with all relevant parties to create a national research. 2. Conduct research with a wide range of stakeholders to study the sensitivity of factors that affecting to health, such as water, sanitation and hygiene, food, disease caused by insects, non communicable diseases, nutrition as well as social-mental illnesses caused by climate change. 3. Survey the cooperation in research in the field of multi-sector engagement to create existing financial resources and to create opportunities for the training 	<ol style="list-style-type: none"> 1. The National Academic research on climate change and health was established by organizing meetings with the representative from the Ministry of Health and other relevant ministries, research institutes, non-governmental organizations, private sectors and disadvantaged groups. 2. Data on meteorology and health impacted data was accessible and integrated. 3. Multi-sectoral research studies, knowledge management network and experts list have been created. 4. The financial support mechanism for supporting the research project and the post-graduation training program was established. 	<ol style="list-style-type: none"> 1. Information on the vulnerability of factors that impact to health, such as water, sanitation and hygiene, food, disease caused by insects, non communicable diseases, nutrition as well as mental and social illnesses caused by climate changes aspects are based on the evidence from research studies for decision-making of policies maker. 2. The research project gets the financial support including post-graduate training programs.

4.6 Component 6: The resilience to climate change and the sustainability of technology and infrastructures

This component will be mentioned the establishment a public health system that resilience to the climate change which necessary to procure the protection and treatment products such as vaccination for diseases that are susceptible to climate change, provide services and resilience infrastructure for climate change, provide newly technology and effective problem solution directions to mitigate the vulnerability of climate change both internal and external of the health sector.

Objective:

1. To adjust the currently infrastructure, technology and processes.
2. To promote new technologies.
3. To sustain the implement of health works.

Main activities	Outputs	Outcomes
<ol style="list-style-type: none"> 1. Maintenance of public health facilities regularly, additional installation or renovation to ensure that clean water, electricity, communications, equipment and medicine are available. 2. Using new technologies such as eHealth or satellite imagery to improve the efficiency of the healthcare system. 3. New public health facilities will be located in the areas without risk of climate change and accessible. 4. Survey the opportunities to develop green health facilities, safe and modern hospitals. 	<ol style="list-style-type: none"> 1. The Standard Operating Procedures (SOPs), with specific details for selecting the location to construct health facilities, electricity, water supply and sanitation facilities have been developed to comply with the expected climatic risk. 2. Project proposals for the development of green health facilities, safe and modern hospitals are progressing. 3. New technologies such as eHealth or satellite images to improve the efficiency of the public health system have been widely used. 	<ol style="list-style-type: none"> 1. The list of reserve water resources, electricity, communications, equipment and medicines has been created.

4.7 Component 7: The management of environmental factors that impact to health

This component means that to indicate the key impact of climate change on health, to increase the illness and mortality that associated to the environmental and basic healthcare as well as to improve environment and social factors impact to the health, which starting with the revision and improvement of legislation, policies, measurements and standards of all relevant sectors.

Objective:

1. To enhance health protection through the involvement of many sectors by including healthcare into the policies of all relevant sectors such as water resources and the environment, labor health management, energy and mining, public works and transportation, industry and trade, agriculture and forestry.
2. To ensure that there is a consistent follow-up of several sectors on environmental risk by using legislation, standards and health risk management.
3. To enhance the coordination, planning with multiple sectors including sharing of information to manage environmental risk factors to health.

Main activities	Outputs	Outcomes
<ol style="list-style-type: none"> 1. Implement the collaboration with various parties to strengthen monitoring across multiple sectors including mechanisms. 2. Hold meetings with relevant ministries and departments regarding the review and amendment of legislation related to air quality, water quality, food quality, housing security, waste management, urban development. 3. Hold meetings with relevant ministries and departments regarding the promotion and using of policies and guidelines on health impact assessment in major development projects such as hydropower dam, mining, access road and railway, industrial and commercial, agriculture and forestry, hospital construction projects. 	<ol style="list-style-type: none"> 1. Integrated monitoring systems that can be collect and analyze information on environmental hazards, socio-economic factors and health outcomes have been created. 2. The regulation on environmental factors Impact to health (Air Quality, Water Quality, Food Quality, Housing Security, Waste Management) have been reviewed and mandated to reflect the changing the climatic conditions to be wider. 3. Health impact assessments of related sectors such as energy and mining, industry, agriculture and transportation have been carried out. 	<ol style="list-style-type: none"> 1. The effects of environmental factors on health before, during and after incidents occurrence of severe weather conditions were monitored and controlled by consider from the risk of climatic conditions.

4.8 Component 8: The public health plan creation from the informed climate change information

This component explains that in addition to work with relevant departments, the health sector is directly responsible for programs or projects related to health risks from climate change, such as diseases caused by insects, waterborne diseases, malnutrition, etc.

Objective:

1. To strengthen coordination and reporting related to susceptible sources of disease information resources and the risk that vulnerable to climate conditions in order to create timely and effective resolution activities.
2. To introduce and develop diagnostic clinics and diagnosis of environmental diseases to improve the treatment of infections caused by environmental factors.

Main activities	Outputs	Outcomes
<ol style="list-style-type: none"> 1. Using the information from monitoring, epidemiological surveillance and environmental monitoring surveillance of health impacts, pre-events, during and after events occurrence of severe weather conditions in the identified risk areas for monitoring with many sectors that concerned to the environmental risk which vulnerability to climate conditions. 2. Use the information from Component 4 to develop a plan and set adaptation measures <ol style="list-style-type: none"> 2.1. Develop a water, sanitation and hygiene plans for vulnerable communities and implement. 2.2. Develop a dengue control plan in a disadvantaged community and implement. 2.3. Develop a non-communicable disease plan in a disadvantaged community and implement. 2.4. Develop a nutritional plan in a disadvantaged community and implement. 2.5. Develop women's health, reproductive health and child health plans in a vulnerable community and implement. 2.6. Develop neglected tropical diseases in a disadvantaged community and implement. 	<ol style="list-style-type: none"> 1. Risk maps and seasonal disease trend analysis are used to identify resource targets and preventive measures for people who are at risk in the identified areas 2. Medical Emergency Plan In the event of serious airborne events to control the outbreak of communicable diseases in newly resettlement area have been developed and testing to utilize. 3. Climatic information has been used in public health strategies and plans, including strategies and information plans. 4. Adaptation measure from 	<ol style="list-style-type: none"> 1. Good finding and responding to the climatic conditions sensitive diseases can prevent the epidemic of serious diseases.

<p>2.7. Developing mental health plans in a disadvantaged community and implement.</p> <p>3. Introduce climate information into health strategies and public health plans, including strategies and information plans, especially clean water, sanitation and hygiene, nutrition, emergencies and communicable diseases.</p>	<p>climate change is carried out in the disadvantaged communities to cut out or reduce susceptibility to climate change.</p>	
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4.9 Component 9: The preparation and management of emergencies

The outbreak of disease and emergencies impact to the health is the main problem caused by climate change. Readiness plans for climate change, emergencies, disaster management and community emergencies are essential for the resilience of climate change. Thus, the public health and community system must manage health risk management and focus on more readiness than regular response.

Objective:

1. To ensure that public health and community systems are able to deal with health risks and focus on readiness rather than focusing on regular response.
2. To enhance of public health and community working performance in dealing with the health risks associated with the emergencies and natural disasters caused by the fluctuations of climatic conditions.
3. To ensure that the current and predicted climate conditions have been listed in the policies, strategies and risk management programs that caused by natural disasters and emergencies

Main activities	Outputs	Outcomes
<ol style="list-style-type: none"> 1. Develop a standard procedure for disaster risk management and emergencies with relevant departments internal and external of the Ministry of Health. 2. Use information from Component 3 and 4 to meet the requirement for real adaptation of the disadvantaged community and the health sector's capacity to prepare for emergencies readiness. <ol style="list-style-type: none"> 2.1. Working with disaster management units to develop emergency plans and procedures for assignment the staff once the severe disaster 	<ol style="list-style-type: none"> 1. Disaster risk management plans are effectively implemented in the times of emergencies and disasters occurred to prevent the epidemic of serious diseases and save the life of people. 2. Emergency plans and procedures for the assignment the staff in the event of serious disasters are endorsed by the management level. 	<ol style="list-style-type: none"> 1. The community and the public health sector are effective in preventing and responding to the severe weather events that contribute to health risks. 2. Health risks that sensitive to climatic conditions existed in the policies, strategies and risk management programs of natural disasters and emergencies sufficiently.

Main activities	Outputs	Outcomes
<p>occurred.</p> <p>2.2. Develop short and long-term plans for public health infrastructure to fight with the diseases that caused by insects and waterborne diseases.</p> <p>2.3. Operate after a severe weather event / assess the damage caused by disasters and disseminate peasants for affected populations by considering the disease that is sensitive to climate and mental illness.</p>		

4.10 Component 10: The financial of public health and climate change

The effective health protection from climate change is required to use the implementation budget which may use the state budget, international and community budgets based on the 2018 - 2025 Strategic Direction and the four-year Implementation Plan (2018-2020) that have been agreed by all relevant parties.

Objective:

1. To raise the funds for resolve the health risks from climate change by engaging in climate change and health to invest in the relevant sectors.
2. To facilitate the funding support from the international organizations to implement of climate change and healthcare operations.

Main activities	Outputs	Outcomes
<ol style="list-style-type: none"> 1. Prepare and submit proposals for health sector adaptation projects from climate change to international organization. 2. Draft a standard operation plan and prioritize the project to raise the funds 	<ol style="list-style-type: none"> 1. Have a list of funding resources and projects related to the climate change and health appropriately. 2. Collaboration with the donors. 	<ol style="list-style-type: none"> 1. Projects related to climate change and health are funded and implemented

Implementation plan from 2018-2020 is attached in the appendix 1.

Part 5

Implementation, evaluation and funding supply

5.1 Implementation

5.1.1 Management structure

The National Adaptation Strategy of public health sector against the Climate Change is the direction for the establishment of the adaptation expansion of the health sector to climate change, from central to local level. Establish a national adaptation committee of public health sector for climate change with the representatives from the departments, centers, concerned departments within the Ministry of Health and external of Ministry of Health to be members of the committee and to joint management, implementation and monitoring of identified strategies and plans which the chairman of the committee is Deputy Minister of the Ministry of Health that focus on hygiene and health works.

Department of hygiene and health promotion is the secretariat, which is the Chairman is the deputy chairman of Department of Hygiene and Health Promotion that focus on the environmental hygiene and labor health management, Deputy Chairman is the Head of Environmental hygiene and labor health management, the members are representative of department, center, relevant divisions internal and external of Ministry of Health. The key functions of the Secretariat are to coordinate and consolidate reports from the localities, including the annual implementation plan and monitoring the implementation of the related of adaptation strategies of the health sector to the climate change.

5.1.2 National coordination mechanism

Coordination mechanisms with all relevant stakeholders at each level need to be created by identify the Secretariat room of this National Adaptation Committee of the Public Health Sector to the Climate Change is located at the Department of Environmental hygiene and labor health management, Division of Hygiene and Health Promotion to be a center of the coordinating to joint implementation of the strategies and plans.

5.1.3 The coordination in provincial and district levels

The Provincial Adaptation Committee of the Public Health Sector on Climate Change should be established by the Head of the provincial health division. For the structure, membership, role and responsibilities of the provincial committees, including the Secretariat of the National Adaptation Committee to the climate change at the central Level.

5.1.4 Implementation methodologies

Strategic Implementation focuses on objectives, outputs and outcomes that are indicated in the strategy by working with many departments, division, centers and relevant sectors to sustain and promote the co-operation and unity capacity of many parties and partners, as well as the support effectively.

5.2 Monitoring and evaluation

The National Committee and the secretariat of the Monitoring / Evaluation Unit are the key indicator that is defined in each objectives, outputs and outcomes, including the tools creation for appropriate and uniform monitoring / evaluation. Key indicators for measuring achievement of strategic implementation and implementation plan are indicated in Table 1 of Appendix 2. The conclusion meeting and the annual plan with all involved organizations will be held in November of each year to review, share knowledge and experience in the

implementation and operations planning annually. After the meeting concluded and there is the annual plan, before payment the budget next year, the secretariat has to coordinate and compile the information from all relevant parties as follows:

- Annual report
- Detail budget report that have been spent
- The detail of next year implementation plan

An evaluation by the end of 2020 should be undertaken to evaluate the progress of the implementation that has been planned before create the next 05-year implementation plan.

5.3 . Budget supply

In order to achieve the overall identifies goals, objectives and outcomes, the meeting on dissemination of Public Health Adaptation Strategic Plan to the climate change from 2016-2025 and Action Plan from 2017-2020 will be held at each level after the adoption of 04 years strategies and plans to understand the strategies and activities presented in the 04-year plan, and to ensure that all relevant stakeholders, including donors, support and cooperate to mobilize capital to implement. The secretariat will coordinate and collaborate with relevant organizations to develop detailed plans and budgets for the implementation of each stakeholder, as agreed in the operational plan. All funds received from both the donor agencies and the international organizations will follow the financial accounting system. The financial audit system must be conduct once a year by an external auditor who has been approved by the donor and the secretariat. The audition should be carried out before the next payment bill.

Prime Minister

References:

1. Climate Change Implementation Plan of Lao PDR from 2013-2020
2. The studies of Climate Change and Health in Lao PDR in 2012
3. WHO. Climate and Health Country Profile, 2015, Lao People's Democratic Republic
4. Carolyn Reimann et Al. Review of climate-sensitive conditions and recommendations for adaptation measures. Lao PDR, 2016
5. WHO. Operational framework for building climate resilient health systems. 2015

Appendix 1:

Public Health Sector Adaptation Implementation Plan on Climate Changing from 2018 - 2020

- Overall target: To promote the capacity of the public health sectors and community to protect and prevent the people health and ourselves from unstable and changing climatic conditions.
- Objective, the output and outcome are defined in the Component 10 of the Strategy. For the indicator defined in topic 5.2 of Part 5 of the Strategies.

Component	Main activities	Timeline			Organization/Responsible person	Require budget(US\$)
		2018	2019	2020		
Component 1: Leadership status and Governance	1.1 Establish committees, units and national coordinators for the adaptation of the public health sector to the climate change, from the central to the local levels including define the roles and responsibilities of each party clearly.	Q1			Secretariat	
	1.2 Establish a team with sufficient staff and materials for the office.	Q1			Department of Hygiene and Health Promotion	
	1.3 Identify the coordination mechanism and report to the related departments and sectors	Q1			Department of Hygiene and Health Promotion	
	1.4 Hold a meeting with the related departments and sectors to sign Memorandum of Understanding between the Ministry of Health and core partners	Q1			Department of Hygiene and Health Promotion and relevant departments	
	1.5 Review the development projects that still not doing the health impact assessments report and implement health impact assessments for new policies, programs and projects of the relevant sectors.	Q1			Department of Hygiene and Health Promotion	
	1.6 Participate in world-class, regional and national meetings, seminars and workshop on climate change and health.	Every time and every where whenever giving the chance			Department of Hygiene and Health Promotion and relevant departments	
	Require budget for Component 1:					50,000

Component	Main activities	Timeline			Organization/Responsible person	Require budget(US\$)
		2018	2019	2020		
Component 2: Organizational and staff capacity strengthening.	2.1 Training for the target staffs (Internal and external of the Ministry of Health) on climate change and health	Q2 Q3	Q2 Q3	Q2 Q3	Department of Hygiene and Health Promotion and relevant departments	
	2.2 Create training courses on climate change and health at the National University and the University of Medical Science.	Q1			National University of Lao and University of Health Science	
	2.3 Develop/update technical diagnostic guideline, investigation, control, prevention and treatment (dengue, diarrhea, typhoid, urinary disease), injuries and foodborne diseases.	Q1	Q1	Q1	Division and relevant center	
	2.4 Develop a communication strategic plan related to the climate change and health (such as preparing, printing and distributing the health educational advertising tools, TV shows and radio that exposed the impacts by climate change and appropriate responses, prevention measures during high / low temperatures, flood and drought events, and other measures to prevent diseases that are susceptible to the climate change with particular attention to disadvantaged groups (elderly, children, women, and the high risk areas to be epidemics).		Every time, Every where		Department of Hygiene and Health Promotion, Medical and Health Information Center and relevant departments	
	2.5 Establish gender equality plans related to the climate change and health and implement joint action with all related activities.		Every time every where			
	Require budget for Component 2:					200,000

Component	Main activities	Timeline			Organization/Responsible person	Require budget(US\$)
		2018	2019	2020		
Component 3: Sensitivities, Capacities and Adaptation assessments.	3.1 Identify the most disadvantaged communities to the fluctuations and changing in climatic conditions and related health risks by existing information.				Secretariat	
	3.2 Assess the health system capacity to cope with health risks from the climate change and create maps to implement appropriate activities (such as diagnostic and therapeutic capacities, diagnosis rooms, etc.)	Q1			Department of Hygiene and Health Promotion, Division of Healing, Hospital, University of Medical Science	
	3.3 Hold meetings with the Environmental and Social Impact Assessment Department and other relevant departments on integrating health impact assessments into all development projects.	Q1			Department of Hygiene and Health Promotion, Department of Environment and Social Impact assessment and other relevant departments	
	3.4 Assess public health structures at all levels (especially disaster area) to respond to the climatic sensitive diseases (dengue, diarrhea, typhoid fever, urinary disease).	Q2Q3	Q2Q3	Q2Q3	Department of Hygiene and Health Promotion, Division of Healing, Hospital, University of Medical Science	
	3.5 Develop project proposals, recommendations and adaptation strategic plan to resolve the identified defects.	Q1	Q1	Q1	Department of Hygiene and Health Promotion	
	3.6 Analysis the climatic conditions, diseases and other relevant information/parameter (exposures, adaptability)	Q1 to Q4	Q1 to Q4	Q1 to Q4	Department of Hygiene and Health Promotion, Epidemic analysis center, Department of Meteorology, Department of Climate change and	

Component	Main activities	Timeline			Organization/Responsible person	Require budget(US\$)
		2018	2019	2020		
					relevant centers	
	3.7 Develop community capacities by creating activities with adaptive measures in the identified disadvantaged communities.	Q1 to Q4	Q1 to Q4	Q1 to Q4	secretariat	
Require budget for Component 3:						500,000
Component 4: Integration of risk monitoring and warning systems.	4.1 Collect and analyze data of some key variables (such as extreme temperatures, rainfall, humidity, illness and death from the climate change sensitive diseases) that are related to communicable diseases, disease caused by insects, and other hazards.	Q1 to Q4	Q1 to Q4	Q1 to Q4	Department of Hygiene and Health Promotion, Epidemic analysis center, Department of Meteorology, Department of Climate change and relevant centers	
	4.2 Create and test website reporting system for symptoms, laboratory, environmental hygiene aspects of climate change sensitive diseases.	Q1 to Q4	Q1 to Q4	Q1 to Q4	secretariat	
	4.3 Provide strong support on disease surveillance, reporting, monitoring and control/mitigate activities for disease caused by insects.	Q1 to Q4	Q1 to Q4	Q1 to Q4	Department of Disease Control and Epidemiology analysis center	
	4.4 Track early warning systems by using mosquito and weather forecast data	Q1 to Q4	Q1 to Q4	Q1 to Q4	Department of Hygiene and Health Promotion, Epidemic analysis center, Department of Meteorology, Department of Climate change and relevant centers	
	Require budget for Component 4:					

Component	Main activities	Timeline			Organization/Responsible person	Require budget(US\$)
		2018	2019	2020		
Component 5: The studies on climate change and health.	5.1 Hold a meeting with all relevant parties to create a national research agenda	Q1			Department of hygiene and health promotion, Departments and relevant centers	
	5.2 Conduct research with a wide range of stakeholders to study the sensitivity of factors the impact to the health such as water, sanitation and hygiene, food, disease caused by insects, non communicable diseases, nutrition as well as mental and social illnesses caused by climate change.	Q2	Q2	Q2	Department of hygiene and health promotion, Departments and relevant centers	
	5.3 Survey co-operation in research on the involvement network of multiple sectors to build existing financial resources and create opportunities for training.	Q1			Department of Hygiene and Health Promotion and University of Medical Science	
	Require budget for Component 5:					50,000
Component 6: Resilience to the climate change conditions and the sustainability of Technology and infrastructure.	6.1 Maintenance of public health facilities regularly, additional installation, or restoration to ensure that clean water, electricity, communications, equipment, and medicine are available.	Q1 to Q4	Q1 to Q4	Q1 to Q4	Department of Healing and Hospital	
	6.2 Using new technologies such as eHealth or satellite imagery to improve the healthcare system performance.	Q1 to Q4	Q1 to Q4	Q1 to Q4	The provincial health department and hospital	
	6.3 New public health facilities will be located in non-risk areas of climate change and accessible.	Q1 to Q4	Q1 to Q4	Q1 to Q4	Department of Healing and provincial health department and hospital	
	6.4 Survey opportunities to develop green health facilities, safe and modern hospitals.	Q1			Department of Healing and provincial health department and hospital	

Component	Main activities	Timeline			Organization/Responsible person	Require budget(US\$)
		2018	2019	2020		
	Require budget for Component 6:					200,000
Component 7: Environmental Health Impacts Factor Management.	7.1 Conduct the coordination and collaboration with various parties to strengthen monitoring across multiple sectors including mechanisms.	Q1	Q1	Q1	Secretariat	
	7.2 Hold meetings with relevant ministries and departments regarding the review and amendment of legislation related to the air quality, water quality, food quality, housing security, waste management and urban development.	Q2	Q2	Q2	Department of Hygiene and Health Promotion, Departments and relevant centers	
	7.3 Hold meetings with relevant ministries and departments regarding the promotion and using of policies and health impact assessment guideline in major development projects such as hydropower dam, mining, road and railway, industrial and commercial, agriculture and forestry, hospital construction projects.	Q3	Q3	Q3	Department of Hygiene and Health Promotion, Departments and relevant centers	
	Require budget for Component 7:					50,000
Component 8: Developing a public health plan from climate change information on	8.1 Using the information from monitoring, epidemiological surveillance and environmental monitoring factor surveillance that impact to the health, pre-events, during and after events occurrence of severe weather conditions in the identified risk areas for joint monitoring with many sectors on environmental risks that sensitive to the climate change.	Q1 to Q4	Q1 to Q4	Q1 to Q4	Secretariat	
	8.2 Use information from Component 4 to create a plan and identify the adaptation measures	Q1 to Q4	Q1 to Q4	Q1 to Q4		

Component	Main activities	Timeline			Organization/Responsible person	Require budget(US\$)
		2018	2019	2020		
	8.2.1 Develop a water, sanitation and hygiene plans for vulnerable communities and implement.	Q1 to Q4	Q1 to Q4	Q1 to Q4	Environmental Hygiene and clean water supply center	
	8.2.2 Develop a dengue control plan in a disadvantaged community and implement.	Q1 to Q4	Q1 to Q4	Q1 to Q4	Malaria control and Epidemiology analysis center	
	8.2.3 Develop a non-communicable disease plan in a disadvantaged community and implement.	Q1 to Q4	Q1 to Q4	Q1 to Q4	Department of Healing	
	8.2.4 Develop a nutritional plan in a disadvantaged community and implement.	Q1 to Q4	Q1 to Q4	Q1 to Q4	Nutrition Center	
	8.2.5 Develop women's, reproductive and child health plans in a disadvantaged community and implement.	Q1 to Q4	Q1 to Q4	Q1 to Q4	Mother and Children Center	
	8.2.6 Develop neglected tropical diseases in a disadvantaged community and implement.	Q1 to Q4	Q1 to Q4	Q1 to Q4	Department of Communicable Disease control	
	8.2.7 Developing mental health plans in a disadvantaged community and implement.	Q1 to Q4	Q1 to Q4	Q1 to Q4	Department of Mental illness at the hospital	
	8.3 Introduce climate condition information into health strategies and plans including strategies and information plans, especially clean water, sanitation and hygiene, nutrition, emergencies and communicable diseases.	Q1 to Q4	Q1 to Q4	Q1 to Q4	Secretariat and medical information	
	Require budget for Component 8:					3.000.000
Component 9: Emergencies preparation and management	9.1 Develop a standard operation procedure for disaster risk management and emergencies with relevant departments both internal and external of the Ministry of Health.	Q1			Secretariat	

Component	Main activities	Timeline			Organization/Responsible person	Require budget(US\$)
		2018	2019	2020		
	9.2 Use the information from Component 3 and 4 to meet the requirement for real adaptation of the disadvantaged community and the public health sector's capacity to prepare the readiness in cases of emergencies happened.					
	9.2.1 Co-working with disaster management units to develop emergency plans and procedures for assign staff once the severe disaster occurred.	Q1 to Q4	Q1 to Q4	Q1 to Q4	Secretariat and disaster management unit, Ministry of Health	
	9.2.2 Develop short-term and long-term health infrastructure to cope with the diseases caused by insects, water-borne diseases and then implementation.	Q1 to Q4	Q1 to Q4	Q1 to Q4	Hospital at each level	
	9.2.3 Operate after a severe weather event / assess the damages caused by disasters and disseminate peasants for affected populations by consider from climate change sensitivities disease and mental illness.	Operate every time after a severe weather event			Disaster management unit, Ministry of Health	
	Require budget for Component 9:					1,000,000
Component 10: Public health finance and climate change	10.1 Prepare and submit project proposals for public health sector adaptation projects from climate change to international organization.	Q3	Q3	Q3	Secretariat	
	10.2 Draft a standard operation procedure and prioritize the project to raise the funds	Q1			Secretariat	
	Require budget for Component 10:					30,000
Total required budget						5,580,000

Summary of required budget for each component

No.	Component	Require budget (US\$)
1	Component 1: Leadership status and governance	50,000
2	Component 2: The strengthening on organization and staff capacities building	200,000
3	Component 3: Sensitivities, Capacities and Adaptation evaluations	500,000
4	Component 4: The Integration of risk and warning system monitoring	500,000
5	Component 5: The research on climate change and health	50,000
6	Component 6: The resilience to climate change and sustainability of technology and infrastructure.	200,000
7	Component 7: The management of environmental factors that impact to health	50,000
8	Component 8: The establishment of public health plan from the informed climate change information	3,000,000
9	Component 9: The emergencies preparation and management	1,000,000
10	Component 10: Public health and climate change financial budget	30,000
	Total required budget	5,580,000

Appendix 2:

Table 1: Key indicators to measure the success of the implementation of the strategy and implementation plan

Component	Key indicators	Verification resources
Component 1: Leadership status and governance	<ul style="list-style-type: none"> • The Committee, Unit, Coordinator and the Adaptation Team of the Public Health Sector from the Climate Change will be established by the Ministry of Health by the end of 2017 • Completion of the coordinated co-operation mechanism by the end of 2017 • At least 03 workshops / seminars have been conducted with the department and related sectors • At least 02 projects/year have developed Health Impact Assessment Reports • At least 03Memorandum of Understanding has been signed with the relevant stakeholders (Department of Energy and Mines, Department of Industry, Department of Civil Engineering) • 20 people attended the meeting, seminars and workshop on the global, regional and national stages. 	<ul style="list-style-type: none"> • Resolution • Report • Minute of meeting • Memorandum of Understanding
Component 2: The strengthening on organization and staff capacities building	<ul style="list-style-type: none"> • 100 people / year had attended the workshop (50% of women are attended) • Teaching at least 8 hours on climate change and health has taken into the National University and the University of Medical Science. • At least 5 technical recommendations regarding the diagnosis, investigation, control, prevention and treatment (dengue, diarrhea, typhoid fever, urinary disease), injuries and foodborne diseases that has been improved and new creation. • At least 03 times/year conducting the workshop • At least 10,000 posters / brochures produced and distributed to the target communities • At least 2 times of TV / radio advertisement per month • There is a communication strategy related to climate change and health • There are implementation plans on gender roles related to the climate change and health. 	<ul style="list-style-type: none"> • Training report • Minute of meeting • Media production reports and mass media reports

Component	Key indicators	Verification resources
Component 3: Sensitivities, Capacities and Adaptation evaluations	<ul style="list-style-type: none"> • The 100 most disadvantaged communities to the weather fluctuation condition and climate change have been identified. • At least 3 meetings/year have been conducted with the Environment and Social Impact Assessment Department and other relevant departments on integrating health impact assessments into all development projects. • At least 04 projects and adaptation plan have been established • There is a list of health sensitive areas • At least 100 sensitive communities have built the adaptive measures activity • There is a disadvantageous community map that adapts to the climate change 	<ul style="list-style-type: none"> • Reports • Minute of meeting • The list of sensitive areas
Component 4: The Integration of risk and warning system monitoring	<ul style="list-style-type: none"> • 1 time / month has analyzed the information on climate change and diseases • 1 time / month has been reported the disease to be sensitive to the climate change • 1 time/week, has a monitoring reports and control activities / insecticide report. • 1 time / quarterly has been reported in early warning system 	<ul style="list-style-type: none"> • Analysis report • Disease report • Early warning report • Minute of meeting • Research report
Component 5: The research on climate change and health	<ul style="list-style-type: none"> • At least 3 meeting sessions were held with all parties involved in the National Research Agenda • At least 2 topics/year that have conducted the research • At least 2 recommendations/year of the research that have been carried out 	
Component 6: The resilience to climate change and sustainability of technology and infrastructure.	<ul style="list-style-type: none"> • 10 district hospital and 50 healthcare center had been installed or renovate to ensure there are clean water, electricity, communication, equipment and medicines. • 10 district hospital and 50 healthcare center that use new technology such as eHealth or satellite image on the effectiveness improvement of public health systems. • 10 new healthcare center located in the areas that not risk from climate change and accessible • 3 proposals for green hospital development, safety hospital in central and provincial levels. 	<ul style="list-style-type: none"> • Report on installation and renovation • Report on new technology utilization • Report on the establishment of healthcare center in safe area. • Project proposal

Component	Key indicators	Verification resources
Component 7: The management of environmental factors that impact to health	<ul style="list-style-type: none"> • There are at least 5 meetings with ministries, departments related to the review and revise regulations on air quality, water quality, food quality, safety shelter, waste disposal and urban development. • There are Health Impact Assessment Report 2 projects/year 	<ul style="list-style-type: none"> • Minute of meeting • Project proposal
Component 8: The establishment of public health plan from the informed climate change information	<ul style="list-style-type: none"> • Monitoring at least 04 times/year • 20 sensitive communities that implemented on water, sanitation and hygiene • 20 sensitive communities that implemented on dengue control • 10 sensitive communities that implemented on noncommunicable disease • 20 sensitive communities that implemented on nutrition • 20 sensitive communities that implemented on women health, reproductive and children health • 10 sensitive communities that implement the mental illness 	<ul style="list-style-type: none"> • Monitoring reports • Implementation Report on Water, Sanitation and Hygiene, Dengue Control, Noncommunicable Diseases, Nutrition, Health for Women, Reproductive and Child Health, Mental Illness
Component 9: The emergencies preparation and management	<ul style="list-style-type: none"> • There are plans and steps to be prepare for response the emergencies • At least 50 officers participate during the severe disaster occur • 10 times of disaster management team implement after severe weather event/assess the lost from disaster and dissemination 	<ul style="list-style-type: none"> • Plan • Report on the participation during disaster
Component 10: Public health and climate change financial budget	<ul style="list-style-type: none"> • Number of proposal on public health adaptation from climate change that submit to the international organization 	<ul style="list-style-type: none"> • Project proposal