

HEALTH RISK ASSESSMENT

Consequence x Likelihood = Risk Priority Level

1. Consequence Rating

The consequences of potential health impacts are considered in terms of the **magnitude** of the impact. These include the severity of the health impact, the number of people affected, the duration of the impact and the socio-economic implications.

Consequence	Examples
Catastrophic	Large numbers of serious injuries, illnesses or loss of life. Severe and widespread disruption to communities. Long-term inability to deliver essential goods and services. Severe long-term reductions in quality of life. Huge economic costs.
Major	Small numbers of serious injuries, illnesses or loss of life. Significant, widespread disruption to communities. Significant decline in delivery of essential goods and services. Significant long-term decline in quality of life.
Moderate	Small number of minor injuries or illnesses. Significant disruption to some communities. Significant decline in delivery of essential goods and services. Significant short-term or minor long-term reduction in quality of life.
Minor	Serious near misses or minor injuries Isolated short-term disruption to some communities. Isolated but significant reductions in essential goods and services. Minor reductions in quality of life.
Insignificant	Appearance of a threat but no actual harm. Very minor disruption to small section of community. Isolated, minor reduction in delivery of essential goods and services. Insignificant impacts on quality of life.

2. Likelihood Rating

Gives an estimate of the likelihood that a risk will occur, if the climate change scenario occurs

Likelihood	Description
Almost certain	Is expected to occur in most circumstances
Likely	Will probably occur in most circumstances.
Possible	Might occur at some time.
Unlikely	Could occur at some time.
Rare	May occur only in exceptional circumstances.

3. Risk Priority Levels

Results from consequence and likelihood assessments are entered into the risk priority matrix.

Likelihood	Consequences				
	Insignificant	Minor	Moderate	Major	Catastrophic
Almost Certain	Medium	Medium	High	Extreme	Extreme
Likely	Low	Medium	High	High	Extreme
Possible	Low	Medium	Medium	High	High
Unlikely	Low	Low	Medium	Medium	Medium
Rare	Low	Low	Low	Low	Medium

Human Health Resources Training

What are your priority themes for the Human Health assessment in your national communication?

Priority Themes	Why?

What are the key climate change impact drivers for human health in your national communication for each of the following?

	Physical Environment	Social Environment	Services and Infrastructure	Environmental diseases
Drivers				
How do these influence human health?				
What evidence do you have?				

How can you determine the current population profile of your country and potential vulnerabilities of people to climate change?

1. Population data -current Country information

What specific parameters are required?	Where are the sources of information?	How can any gaps in knowledge be obtained?	Who can assist with obtaining information?
Population demographics			
Regional components			
Existing infrastructure			
Existing social services			

2. Vulnerability assessment

Vulnerability Type	What further information is required?	What/where are the sources of information?	Who can assist with obtaining information?
Population groups			
Regions			
Infrastructure			
Social services			

Health Impacts Table 1

Physical environment: Air, water, chemicals, soil, other environmental

Consider at least one example of impacts (environmental and health) and specific vulnerabilities for each of the climate variables?

Climate variable	Impacts to communities and individuals		Vulnerability				Evidence/ uncertainties
	Environmental	Health: -direct -indirect	Regional	Economic	Social	Infra- structure	
Temperature increase							
Rainfall change							
Sea level increase							
Extreme events: • Heatwaves Droughts • Bushfires • Flooding • Storms • Tropical Cyclones							

Health Impacts Table 2

Infrastructure environment: Energy, transport, telecommunications, water, waste

Consider at least one example of impacts (environmental and health) and specific vulnerabilities for each of the climate variables?

Climate variable	Impacts to communities and individuals		Vulnerability				Evidence/ uncertainties
	Environmental	Health: -direct -indirect	Regional	Economic	Social	Infra- structure	
Temperature increase							
Rainfall change							
Sea level increase							
Extreme events: • Heatwaves Droughts • Bushfires • Flooding • Storms • Tropical Cyclones							

Health Impacts Table 3

Environmental diseases: Food-borne, vectors, water-borne, other environmental diseases

Consider at least one example of impacts (environmental and health) and specific vulnerabilities for each of the climate variables.

Climate variable	Impacts to communities and individuals		Vulnerability				Evidence/ uncertainties
	Environmental	Health: -direct -indirect	Regional	Economic	Social	Infra- structure	
Temperature increase							
Rainfall change							
Sea level increase							
Extreme events: • Heatwaves Droughts • Bushfires • Flooding • Storms • Tropical Cyclones							

Health Impacts Table 4

Social environment:- lifestyle, community, housing, workforce, service provision , population displacement, mental health

Consider at least one example of impacts (environmental and health) and specific vulnerabilities for each of the climate variables.

Climate variable	Impacts to communities and individuals		Vulnerability				Evidence/ uncertainties
	Environmental	Health: -direct -indirect	Regional	Economic	Social	Infra- structure	
Temperature increase							
Rainfall change							
Sea level increase							
Extreme events: • Heatwaves Droughts • Bushfires • Flooding • Storms • Tropical Cyclones							

Coping Capacity Table

Choose three or four health impacts and give a few examples of what is being implemented now to minimize negative impacts

Health impacts	Current controls	Limitations	Effectiveness in 2030	Gaps for 2030	Sectors involved

Health Risk to Humans

Use the following health impacts to calculate the risks to humans.

Water borne diseases	Consequence	Likelihood	Risk	Evidence/ reason for decision	Further information required
<ul style="list-style-type: none"> • <u>Diseases:</u> <ul style="list-style-type: none"> • Gastro-intestinal diseases producing diarrhoea, vomiting • <u>Impacts:</u> <p><i>Extreme events</i></p> <ul style="list-style-type: none"> • Contamination of drinking water sources by pathogens such as cryptosporidiosis. • Contamination from wildlife and stock deaths in drought, bushfires <p><i>Gradual changes</i></p> <ul style="list-style-type: none"> • Change in incidence of water-borne pathogens such as Cryptosporidium, Campylobacter, amoeba in recreational waters • Increase in harmful algal blooms • Increased use of grey-water - increased contact with pathogens 					

Rank the Impacts You Have Assessed.

Risk level	Health impact
Extreme	
High	
Medium	
Low	

Table: 1 - Direct Physical Impacts of Extreme Events – Tropical Cyclones, Storms, Floods, Bushfires

Possible Adaptation Measures	For each potential adaptation measure:			Sectors
		What is our capacity in this regard – in general and for vulnerable regions and groups? (A = adequate, I = inadequate, D = developing, N = not in place)	How can this measure be implemented or upgraded?	
Legislative or Regulatory <ul style="list-style-type: none"> • Cost sharing mechanisms for compensation and adaptation initiatives. • Regulations for minimum building standards to withstand extreme events in vulnerable regions. • Regulations regarding fire management, property management to reduce risk of injuries. • Mid to long-term strategies for land use planning that accounts for likely impacts. 				
Public Education and Communication <ul style="list-style-type: none"> • Improvement in communicating risks of extreme events to vulnerable regions and groups. • Education of measures to reduce risk of damage or injuries. • Evaluation of the effectiveness of educational materials. 				
Surveillance and Monitoring <ul style="list-style-type: none"> • Standardization of information collected after disasters to more accurately measure morbidity and mortality. • Evaluation of responses and health outcomes of extreme events. • Monitoring of appropriate management measures to reduce risk (fire breaks, trees near power lines). 				

Table 1: Direct Physical Impacts of Extreme Events – Tropical Cyclones, Storms, Floods, Bushfires (cont.)

	Capacity		Implementation	Sectors
Ecosystem Intervention <ul style="list-style-type: none"> • Monitor the effects of altered land use on vulnerability to extreme weather events. 				
Infrastructure Development <ul style="list-style-type: none"> • Create or enhance emergency management communication, preparation, training, volunteer recruitment, emergency response coordination, resource allocation. • Mapping of potential risks from extreme events – location of hazardous facilities, vulnerable properties/people. • Land use planning and management to minimize impacts from cyclones, flooding and fire (protective structures, controlled burning). • Restrictive land use zoning for potentially vulnerable regions (sea-level increase, storm surges, cyclones) • Assess ability of current infrastructure/buildings to withstand extreme events. • Make adjustments to infrastructure to ensure the safety of vulnerable groups. • Consider adequacy of current flood plain zones, in relation to sea-level rise and coastal erosion. • Sustainable infrastructure 				
Technological or Engineering <ul style="list-style-type: none"> • Improvement of systems to provide early and accessible warning to the populations most likely to be affected. • Modification of building codes for structures in vulnerable areas. • Construction of seawalls. • Construction of cyclone rated buildings. • Improvements in fire-fighting resources – technology, equipment. 				

Table 1: Direct Physical Impacts of Extreme Events – Tropical Cyclones, Storms, Floods, Bushfires (cont.)

	Capacity		Implementation	Sectors
Health Intervention <ul style="list-style-type: none"> Improved training programmes and information on emergency management. Medical supply management. Increased level of first-aid training of community members in vulnerable regions. 				
Research/ Information <ul style="list-style-type: none"> Regional assessments of vulnerability to extreme events. Regional identification of vulnerable communities and individual. Evaluate effectiveness of early warning systems. Further development of early warning systems – tropical cyclones, fires, droughts. Modelling of effected regions Strengthening public health infrastructure in vulnerable communities Climate change research. Capacity of volunteers in extreme events – ageing population, more events. Communication with remote and mobile populations. Need to understand specific systems – more research from large regional scale to district and local scale Information/research/data needs to be coordinated – data linkages between appropriate sectors, both public and private. 				

Table 2: Direct Health Impacts of Temperature related changes – Heat Events, Increased Temperature

Possible Adaptation Measures	For each Potential Adaptation measure:		Sectors
	What is our capacity in this regard – in general and for vulnerable regions and groups? A=adequate I= inadequate D= developing N = not in place	How can this measure be implemented or upgraded?	
Legislative or Regulatory <ul style="list-style-type: none"> Heat Event Response Plan. Extreme Heat Alert Regulations for minimum energy efficiencies in homes. Regulations to introduce limited power use in high demand/emergency periods. Load shedding – to ensure provision of energy for essential services and communal cooling centres (rec centres, shopping centres) Legislation to commandeer infrastructure such as cold-storage 			
Public Education and Communication <ul style="list-style-type: none"> Declaration of heat emergency and response plan Communication plan to aged care facilities, refuges for homeless, day-care centres, schools. Adequate communication for difficult to reach groups – remote, non-English speaking tourists, mobile population. Implementation of education campaigns on heat avoidance procedures and management of health impacts. Part of heat response plan – guidelines for school attendance, sporting events. Examine previous successful health campaigns aimed at whole of population (eg “slip, slop, slap”). 			

Table 2: Direct Health Impacts of Temperature related changes – Heat Events, Increased Temperature (cont.)

	Capacity		Implementation	Sectors
Surveillance and Monitoring <ul style="list-style-type: none"> • Analysis of daily mortality and morbidity data during heat events 				
Ecosystem Intervention <ul style="list-style-type: none"> • Plant more trees in urban environments. • Introduce green roofs. • Reduce hard surfaces in urban areas. • Increase education of importance of trees in residential areas. • Use of grey-water and recycled water to provide green spaces. 				

Table 2: Direct Health Impacts of Temperature related changes – Heat Events, Increased Temperature (cont.)

	Capacity		Implementation	Sectors
Infrastructure Development <ul style="list-style-type: none"> Improved housing and public buildings (e.g., insulation, guidelines). Improvement of urban design to reduce urban heat island effect. Provision of communal cooling areas for vulnerable groups. Diversify power supplies. Indoor swimming pools. Need correct management to ensure good hygiene. Consider the costs of vegetation loss in infill development. Extend current regulations to water efficiency, building materials. Encourage alternative energy Infrastructure needs to be upgraded to deal with water recycling and reuse. 				
Technological or Engineering <ul style="list-style-type: none"> Implementation or enhancement of heat event warning systems. Improved housing and public building design (e.g., insulation, guidelines, passive-solar). Development of preventative measures other than air conditioning. Pricing of energy and water – incentives for industry to reduce. Building codes need to be periodically reassessed in light of new climate projections and new advances in building material and technology 				

Table 2: Direct Health Impacts of Temperature related changes – Heat Events, Increased Temperature

	Capacity		Implementation	Sectors
Health Intervention <ul style="list-style-type: none"> • Better assessment of personal exposures associated with heat-related illness. • Improved training of medical and support staff in charge of vulnerable groups – aged cared, hostels, day-care centres, schools. • Hospital and nursing home staffing increases during heat-events • Adjust work schedules to avoid heat-stress exposure. • Identification of people at risk and register of vulnerable individuals/groups. 				
Research/ Information <ul style="list-style-type: none"> • Assessment of coping capacity in heat events for health care system and energy sector. • Improvement in the early prediction of heat episodes by determining the key weather parameters associated with poor health outcomes. • Better understanding of physiological and behavioural acclimatization. • Predictive modelling of temperature-mortality relationship in different populations. • Better understanding of the role of air conditioning in reducing impacts. • Urban design – investigate what level of vegetation is required to reduce heat-island impact. Research into the impact of the ageing population on our heat event responses • Development of strong ‘aged’ networks. 				

Table 3: Water-borne Diseases and Water Quality

Contaminated Drinking Water from Extreme Events, Exposure to Pathogens in Recreational Water, Grey-water and Portable Water.

Possible Adaptation Measures	For Each Potential Adaptation Measure:			Sectors
	What is our capacity in this regard, in general and for vulnerable regions and groups? (A = adequate, I = inadequate, D = developing, N = not in place)	How can this measure be implemented or upgraded?		
Legislative or Regulatory <ul style="list-style-type: none"> • Development and enforcement of water quality standards. • Regulation for use of grey-water and grey-water products. • Building/construction standards for facilities that potentially impacts on water quality – eg chemical storage, waste-water treatment • Inclusion of climate change and health considerations in environmental impact assessments • Water conservation regulations • Regulations for retrofitting 				
Public Education and Communication <ul style="list-style-type: none"> • Public awareness/hygiene campaigns in vulnerable communities about water-borne diseases after extreme events • Education on correct use and treatment of grey-water • Education on correct maintenance of private water storage. • Water conservation incentives for private and community based water conservation programmes. • Financial incentives to ensure compliance with new standards and upgrading of existing substandard equipment such as rainwater tanks. • Community engagement to make informed decisions. 				

Table 3: Water-borne Diseases and Water Quality (cont.)

	Capacity- Vulnerability		Implementation	Sectors
Surveillance and Monitoring <ul style="list-style-type: none"> • Monitoring and data collection of water quality with reference to climate variables. • Enhanced private water testing. • Improvements in surveillance and prevention of water-borne disease outbreaks. • Monitoring of grey-water use. • Water quality monitoring and availability. • Related monitoring of environmental toxins and reduction targets. • Possibility of easy to use water testing kits, eg swimming pool kits. 				
Ecosystem Intervention <ul style="list-style-type: none"> • Protection of water catchment areas from contamination - preservation of natural habitat/wetlands, revegetation of river catchments. • Protection of quantity as well as quality – ecosystems do use the water. • Better ecosystems based planning for urban development. 				

Table 3: Water-borne Diseases and Water Quality (cont.)

	Capacity- Vulnerability	Implementation	Sectors
Infrastructure Development <ul style="list-style-type: none"> • Emergency management plans. • Assessment of water and waste water infrastructure with regard to increased risk of extreme precipitation events and droughts. • Use of climate forecasting in water planning. • Improved housing and sanitation practices in vulnerable communities. • Ensure equal access to safe, clean potable water and sanitation. • Development of water quality protection from agricultural, industrial and municipal wastes. Power outages and desalination, wastewater systems, particularly household systems have emergency management plans. • Wastewater requires power to pump – extreme events reducing energy available. • Climate resilient resources. • Carbon neutral water sources. 			
Technological or Engineering <ul style="list-style-type: none"> • Redesign of water control structures to handle greater variability of precipitation – storm-water drains, increased absorption capacity of urban landscapes. • Improving reliability of water and waste water systems in vulnerable communities. • Temporary measures to reduce the pathogen concentration in drinking water, such as chlorine tablets and boil-water alerts. • Use of smart technology; remote telemetry; innovative technology • Development of water testing kits much like swimming pool kits. • Increased use of non-potable water sources in homes. 			

Table 3: Water-borne Diseases and Water Quality (cont.)

	Capacity- Vulnerability	Implementation	Sectors
Health Intervention <ul style="list-style-type: none"> • Appropriate medical treatments and responses in place in response to water-borne infections. • Ensuring access to treatment in remote and vulnerable communities. • Increased training on symptoms and early treatment of water-borne diseases in vulnerable communities 			
Research/ Information <ul style="list-style-type: none"> • Regional assessments of water-climate health issues and identification of vulnerable communities. • Determination of links between land-use and water quality better assessment of the watershed level of the transport and fate of microbial pollutants associated with rainfall. • Relationship between temperature, extreme rainfall events and incidence of water-borne infections. • Molecular tracing of water-borne pathogens. • Understanding of the links between drinking water, recreational exposure, and water-borne disease monitoring. • Undertake vulnerability studies of existing water supply and sanitation systems. • Development of new systems that aim to reduce vulnerability in high-risk communities. • Research on grey-water use and potential health risks. • Effect of temperature and extreme rainfall on Cryptosporidiosis in water supplies (including groundwater) and treatment options. • Consideration of the viability of remote communities 			

Table 4: Vector-Borne Diseases – RRv, BFv, Dengue, MVE, Malaria, rodent-borne, tick-borne and others

Possible Adaptation Measures	For each Potential Adaptation Measure		Sectors
	What is our capacity in this regard – in general and for vulnerable regions and groups? A=adequate I= inadequate D= developing N = not in place	How can this measure be implemented or upgraded?	
Legislative or Regulatory <ul style="list-style-type: none"> Regulations/guidelines for container breeding habitat control eg rainwater tanks, ponds. Ensuring vector control is considered by all relevant sectors. 			
Public Education and Communication <ul style="list-style-type: none"> Health promotion, disease prevention and health care of migrant populations and travellers. Public education programmes regarding the risks associated with mosquito breeding habitat. Improved collaboration between the health, agricultural, forestry, environment and conservation sectors on issues influencing vector-borne disease. 			
Surveillance and Monitoring <ul style="list-style-type: none"> Conducting surveillance of vector density and disease transmission- improved training and resources for this. Surveillance programs to detect new diseases through uncontrolled movements such as illegal fisherman, refugees. Improved reporting of animal health and diseases by agricultural sector. Improvement of active laboratory-based disease surveillance and prevention systems at the state and local level. More effective and rapid electronic exchange of surveillance data. Increased testing for exotic diseases in tourists/migrants/refugees. 			

Table 4: Vector-Borne Diseases Vector-Borne Diseases – RRv, BFv, Dengue, MVE, Malaria, rodent-borne, tick-borne and others (cont.)

	Capacity- Vulnerability		Implementation	Sectors
Ecosystem Intervention <ul style="list-style-type: none"> • Elimination of disease vector breeding sites. • Ecosystem diversity and health along with appropriate land-use planning. 				
Infrastructure Development <ul style="list-style-type: none"> • Management of vectors during periods of high risk. • Collaboration between health, forestry, environment and conservation 				
Technological or Engineering <ul style="list-style-type: none"> • Developing selective and sustainable vector control, including preparedness for emergency control. • 'Over-design' engineering to allow for extreme events. • Contingency planning for allowing access of emergency personnel and equipment to isolated regions. • Road design that does not pool water. • Building design that excludes rodents. 				
Health Intervention <ul style="list-style-type: none"> • Ensuring early diagnosis and prompt treatment of dengue haemorrhagic fever. • Ensuring early diagnosis and prompt treatment of other vector-borne diseases. • Decentralised facilities – quarantine and disease response and testing. • Provision of more doctors with appropriate awareness. • Vaccine Development. 				

Table 4: Vector-Borne Diseases Vector-Borne Diseases – RRv, BFv, Dengue, MVE, Malaria, rodent-borne, tick-borne and others (cont.)

	Capacity- Vulnerability	Implementation	Sectors
Research/Information <ul style="list-style-type: none"> • Assessment of current effectiveness of vector control measures. • Studies of transmission dynamics, including reservoir host and vector ecology. • Improvements in epidemic forecasting. • Research into improved treatment and diagnosis of vector-borne diseases. • Research into development of vaccines. • Influence of human population shifts in next 30 to 50 years on vector-borne diseases. • More accurate projections on climate change impacts likely to influence incidence • Cost-benefit analysis to assess the value of the intervention/monitoring programmes. • Quantitative risk assessments on a regional basis. • Likelihood of exotic mosquito incursion. • Vector competence of Anopheles species for malaria transmission. • Vector competence of native mosquitoes for exotic pathogens. • Natural control mechanisms - competition between dengue mosquito and native species in container habitats. 			

Table 5: Air Quality and Associated Health Impacts
Respiratory Illnesses, Asthma, Allergies, UV Radiation, VOC Exposure, Legionnaires Disease

Possible Adaptation Measures	For each Possible Adaptation Measure:		Sectors
	What is our capacity in this regard – in general and for vulnerable regions and groups? A=adequate I= inadequate D= developing N = not in place	How can this measure be implemented or upgraded?	
Legislative or Regulatory <ul style="list-style-type: none"> • Development and enforcement of air quality standards. • Vehicle inspection programmes. • Land management. • Local government roles in implementation and education. • Sealing roads. • Regions important. • Ability to control activities relating to air quality in times of high risk (traffic, industry, fires). • Indoor air quality standards required. 			
Public Education and Communication <ul style="list-style-type: none"> • Bushfire/control burn pollution – health warnings • Smog alert warning systems and response plans. • Public education on benefits to air quality of reducing car use, wood fires. • Public education on potential risks of legionnaires disease from poorly maintained evaporative air conditioners and use of water-conserving garden products. • Ultraviolets (UV) monitoring and advisory schemes. 			

Table 5: Air Quality and Associated Health Impacts (cont.)

	Capacity		Implementation	Sectors
Surveillance and Monitoring <ul style="list-style-type: none"> • Increased monitoring of air quality. • Surveillance of air pollutants of concern during high risk times (city ozone in heat events, fires). • Analysis of primary health care morbidity data, hospital admissions, emergency attendance. • Monitoring of seasonal patterns of respiratory disease. • Use of 'sentinel' populations in different regions, particularly vulnerable groups. • Pollen monitoring. 				
Ecosystem Intervention <ul style="list-style-type: none"> • Control burning to reduce risk of major fires. • Fire breaks. • Provision of natural shade for UV protection. • Weed management programmes. • Revegetation to control dust. 				
Infrastructure Development <ul style="list-style-type: none"> • Incentives to reduce air pollutants. • Reduce reliance on cars in cities. • Increased shaded areas in cities and public places. • Renewable energy infrastructure needs to be increased. • Government contributions and incentives for improved public transport, hybrid cars etc. 				

Table 5: Air Quality and Associated Health Impacts (cont.)

	Capacity		Implementation	Sectors
Technological or Engineering <ul style="list-style-type: none"> • Development of innovative transportation approaches to reduce air pollution. • Reducing emissions from range of sources. • Urban weather modelling of conditions of inversions in urban weather. • Improvements in UV resistant materials and UV protection. • Incentives to use renewable power sources. • Support research and development (R&D) and implementation. • Development of materials low in volatile organic compounds (VOCs). 				
Health Intervention <ul style="list-style-type: none"> • Improved diagnosis and medical treatment for the range of potential health impacts related to air quality and UV exposure. • Increased recognition of the possible links between climate change, air quality and health impacts. • Sunscreens, eye protection. 				

Table 5: Air Quality and Associated Health Impacts (cont.)

	Capacity		Implementation	Sectors
Research/Information <ul style="list-style-type: none"> • Relationship between air pollutants and climate parameters (eg ozone levels may be affected by cloud cover and wind speeds) • Coordination with research sector on obtaining information about the critical climate parameters. • Health impacts of long-term exposure to high levels of ozone, particularly for vulnerable groups. • Health impacts of possible increased exposure to dust. • Mechanisms of adverse health effects of air pollutants in the general population and within susceptible subgroups • Moderating the impact of air pollution on health through nutrition and other lifestyle characteristics. • Better understanding of potential health impacts of increased use of air conditioning and increased time indoors. • Better understanding of the role of aeroallergens in respiratory morbidity. • Better understanding of the relationship between temperature, behavioural changes and UV exposure. 				

Table 6: Food-borne Disease - Food Poisoning, Seafood Poisoning, Mycotoxins

Possible Adaptation Measures	For each possible adaptation measure:		Sectors
	What is our capacity in this regard – in general and for vulnerable regions and groups? A=adequate I= inadequate D= developing N = not in place	How can this measure be implemented or upgraded?	
Legislative or Regulatory <ul style="list-style-type: none"> Food safety regulations. Agricultural regulations. 			
Public Education and Communication <ul style="list-style-type: none"> Increased education campaigns on food safety and hygiene, particularly in warmer months. 			
Surveillance and Monitoring <ul style="list-style-type: none"> Increased monitoring/surveillance of food poisoning, particularly in high risk periods. Increased monitoring/surveillance of ocean temperatures and incidence of marine toxins - Ciguatera. Monitoring of pathogens in aquaculture/fisheries in areas of risk of contamination during extreme rainfall events. Monitoring of mycotoxins, particularly in high risk periods. Enhancement of collaborations across health, agriculture, fisheries. Fisheries practices. 			

Table 6: Food-borne Disease - Food Poisoning, Seafood Poisoning, Mycotoxins (cont.)

	Capacity		Implementation	Sectors
Ecosystem Intervention <ul style="list-style-type: none"> • Protection of wetlands and natural habitat surrounding fisheries. • Protection of natural habitat surrounding agricultural land. 				
Infrastructure Development				
Technological or Engineering <ul style="list-style-type: none"> • Improved food storage methods, particularly in remote communities. • Improvements in farm storage methods. • Control of sewerage treatment near aquaculture and fisheries, particularly in extreme events. • Development of independent power sources in remote communities. 				

Table 6: Food-borne Disease - Food Poisoning, Seafood Poisoning, Mycotoxins (cont.)

	Capacity		Implementation	Sectors
Health Intervention <ul style="list-style-type: none"> • Standard medical treatment 				
Research/Information <ul style="list-style-type: none"> • Data collection examining potential links between climate parameters and food poisoning – identification of organisms likely to proliferate under new climate conditions • Emergence of new food-borne pathogens • Research into impacts of behavioural changes (more outdoor eating) on incidence of food poisoning. • Emergence of new marine organisms with health impacts. 				

Table 7: Food Production – Prices and Availability-Fall in quality of Diet, Imported Food Health Risks

Possible Adaptation Measures	For each possible adaptation measure:		Sector
	What is our capacity in this regard – in general and for vulnerable regions and groups? A=adequate, I= inadequate D= developing, N = not in place	How can this measure be implemented or upgraded?	
Legislative or Regulatory <ul style="list-style-type: none"> • Integration of climate change and health considerations into food import and regulatory activities. • Potential impacts of climate change incorporated into national food and nutritional policies. • Mechanisms to support equitable prices and access to nutritional foods, especially in remote communities. • Risk assessments of food imports and local foods need to be undertaken with climate change considerations. 			
Public Education and Communication <ul style="list-style-type: none"> • Education regarding nutritional standards. • Education programmes for primary producers on potential impacts of climate change on agricultural practices. 			

Table 7: Food Production – Prices and Availability-Fall in quality of Diet, Imported Food Health Risks (cont.)

	Capacity		Implementation	Sectors
Surveillance and Monitoring <ul style="list-style-type: none"> • Monitoring of crop yields. • Monitoring of nutritional content of foods. • Monitoring of food prices and affordability, especially in relation to climate and extreme events. • Monitoring of imported food levels. • Increased surveillance and monitoring programmes for food safety in imported foods. • Monitoring of potentially emerging contaminants such as mycotoxins. • Monitoring of antibiotic use in animal feed that may increase due to higher heat stress, particularly with imported foods. • Alternative strategies for monitoring increased level of imports – need more than end-product testing. 				
Ecosystem Intervention <ul style="list-style-type: none"> • Conservation measures for natural habitat. 				
Infrastructure Development <ul style="list-style-type: none"> • Development of long-term strategic plans for agriculture. • Land-use- appropriate agricultural precincts in urban areas. 				

Table 7: Food Production – Prices and Availability-Fall in quality of Diet, Imported Food Health Risks (cont.)

	Capacity		Implementation	Sectors
Technological or Engineering <ul style="list-style-type: none"> • Diversification of agriculture • Drought-resistant, pest-resistant crops. • Improvements in crop yield modelling • Improvements in shelf-life especially for remote communities. • Post-harvest strategies for fresh food and seafood. • Encourage systems for producing own food. 				
Health Intervention				
Research/Information <ul style="list-style-type: none"> • Relationship of climate change – extreme weather events, rainfall and temperature changes to the cost and availability of locally grown food. • Alternative crops. • Drought resistant crops. • Pest resistant crops. • Sustainable crops. • Assessment of regional agricultural vulnerability • Research into alternative foods and development of independent food sources. • Acceptability of alternatives • Relationship between availability and food standards (scarce food – quality level drops) 				

Social/Community/Lifestyle-Dislocation, Mental Health

Possible Adaptation Measures	For each possible adaptation measure:		Sectors
	What is our capacity in this regard – in general and for vulnerable regions and groups? A=adequate I= inadequate D= developing N = not in place	How can this measure be implemented or upgraded?	
Legislative or Regulatory <ul style="list-style-type: none"> Requirement to disclose regional vulnerabilities to sea-level rise. Regulations regarding compensation arrangements for forced relocations. Provision for insurance in areas where private insurance is unavailable. Issue of risk communication and disclaimers to land purchasers. (similar to noise issues or contaminated sites) Regulatory restrictions on land-use and development in coastal zones Shared responsibility – appropriate funding for vulnerable regions. Use of UK – food rule – fresh produce must display place of origin – encourage local production and purchase of food. 			

Social/Community/Lifestyle-Dislocation, Mental Health (cont.)

	Capacity		Implementation	Sectors
Public Education and Communication <ul style="list-style-type: none"> • Raise awareness in coastal regions with respect to future risks of sea-level rise. • Strengthen community resilience and health through community based health programmes • Raise awareness on impacts of climate change and risks in vulnerable regions. • Education on energy sustainability. • Cross sectoral information sharing. • Taskforce for impacts of climate change on coastal communities. • Open dialogues 				
Surveillance and Monitoring <ul style="list-style-type: none"> • Improvement in monitoring of mental health in rural areas. • Evaluation of mental health care in response to extreme events, especially groups vulnerable to the adverse psychosocial effects of extreme events, such as children, elderly people and bereaved people. • Surveillance programmes for agricultural pests and weeds, native flora and fauna and marine environment. 				

Social/Community/Lifestyle-Dislocation, Mental Health (cont.)

	Capacity		Implementation	Sectors
Ecosystem Intervention <ul style="list-style-type: none"> • Protection of natural habitat. • Education regarding ecosystem impacts and role in health. 				
Infrastructure Development <ul style="list-style-type: none"> • Development of healthy communities. • Long-term planning for alternative income streams for vulnerable populations. • Long-term planning for communities vulnerable to climate change and depopulation. • Identification of new industries and businesses that may emerge from climate change • Long-term planning for land-use with respect to sea-level rise. • Develop contingency relocation plans in case of sea level rise • Regional investment funds • Support for local governments – currently may not be in a position to fund 'partnerships. 				

Social/Community/Lifestyle-Dislocation, Mental Health (cont.)

	Capacity		Implementation	Sectors
Health Intervention <ul style="list-style-type: none"> • More resources for mental health services in vulnerable regions. • Training for the potential mental health impacts of climate change. 				
Research/Information <ul style="list-style-type: none"> • Better understanding of the mental health effects of extreme events and gradual impacts such as drought, particularly in vulnerable regions • Research into early warning systems for social impacts of climate change. • Assessment of sea-level rise and extreme weather impacts on coastal communities • Policies to protect low-income groups from added financial pressures of climate change. • Population modelling in relation to climate change – health implications of projected population changes. • Research into relationship between temperature, heat events and rates of crime, accidents. • Community comprehensive review on impacts on communities and how to sustain and promote healthy communities. 				

General Adaptation Measures

Possible Adaptation Measures	For each possible adaptation measure:		Sectors
	What is our capacity in this regard – in general and for vulnerable regions and groups? A=adequate I= inadequate D= developing N = not in place	How can this measure be implemented or upgraded?	
Legislative or Regulatory <ul style="list-style-type: none"> • Policy development for a coordinated body to organize adaptation responses. • Integrated assessments of environmental, economic and health impacts of climate change. • Integrated assessments of environmental, economic and health impacts of climate change mitigation and adaptation measures. • Incorporate adaptation measures into long-term policies and action plans. • Cost sharing mechanisms for compensation and adaptation initiatives. • Coordinated responses through whole of government approach. • More prominence given to health impacts in generic responses. • Coordinated funding allocation to assess and implement appropriate adaptations. • Development of a long-term approach to reducing the risks of climate change (including bipartisan support) 			

General Adaptation Measures

	Capacity		Implementation	Sectors
Public Education and Communication <ul style="list-style-type: none"> • Increase awareness of links between climate change and health. • Increase awareness of adaptation. • Education programmes targeted specifically for vulnerable groups. • Web resources – need development and populated with appropriate information. • Establishment of a central coordinated government sanctioned information source. 				
Surveillance and Monitoring <ul style="list-style-type: none"> • Monitoring of climate parameters. • Monitoring of health impacts. • Monitoring of population changes. • Monitor early impacts of health changes around the world. • Monitor adaptations and technologies being implemented elsewhere and assess for relevance 				
Ecosystem Intervention <ul style="list-style-type: none"> • Conservation and biodiversity measures. 				

General Adaptation Measures (cont.)

	Capacity	Implementation	Sectors
Infrastructure Development <ul style="list-style-type: none"> • General improvements in public health infrastructure and resources. • Long term assessment of infrastructure needs. • Financial consideration of the long-term economic impacts of infrastructure spending due to climate change. • Establish methods of cost-sharing where economic burdens are high. 			
Technological or Engineering <ul style="list-style-type: none"> • Solutions to withstand new climate parameters. • Solutions to prevent or reduce risk of health impacts from climate change. • Solutions to improve access and affordability of adaptation measures. 			
Health Intervention <ul style="list-style-type: none"> • Improved medical access for remote communities and vulnerable groups. • Improved education and awareness of health professionals of links between health and climate. • Understanding of the risk for the emergence of new, unfamiliar diseases and health impacts. 			

General Adaptation Measures (cont.)

	Capacity	Implementation	Sectors
Research/ Information <ul style="list-style-type: none"> • Regional assessments – identification of vulnerable groups, areas and infrastructure. • Regional adaptation plans • Sustainable adaptation. • Quantitative assessments where practicable. • Improved climate projections. • Understanding the links between climate parameters and health impacts. • Strong collaboration/communication between health and climate scientists. • Evidence of effects of climate change that may impact on health. • Cost-benefit analysis of adaptation measures. • Assessment of the affordability of adaptation measures – especially in relation to low income groups. • Assessment of coincidental costs and benefits to health of adaptation and mitigation. • Evaluation of adaptation options. 			