

# GUIDEBOOK

on the methodology for financial assessments  
to address climate change

## CHAPTER X: HEALTH SECTOR

(adaptation to climate change)



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### About this publication

This methodology is an update to the first financial assessment methodology, which was released in 2009. The objective of this methodology is to support countries to implement their climate targets and to identify, reallocate, mobilize and manage the required financial resources and to create a fiscal framework conducive for climate action.

The update to this methodology was developed under UNDP's Climate Promise by the *Pledge to Impact* Programme. Delivered in collaboration with a wide variety of partners, the initiative has supported over 120 countries to enhance and implement Nationally Determined Contributions (NDCs) under the Paris Agreement. From Pledge to Impact is generously supported by the governments of Germany, Japan, United Kingdom, Sweden, Belgium, Spain, Iceland, the Netherlands, Portugal and other UNDP core contributors. This programme underpins UNDP's contribution to the NDC Partnership.

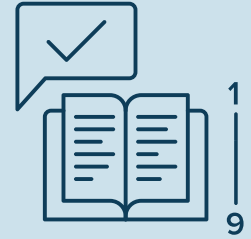
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# About this Guidebook

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As countries identify their national climate change targets—notably through Nationally Determined Contributions (NDCs) under the Paris Agreement—the need exists to break down targets into concrete steps of action, determine a financial framework to implement actions and achieve targets, and identify policy measures to facilitate the necessary changes that support low-emission development and a low-carbon future.

A key component to support this transformation is through assessing national investment flows and financial flows to address climate change. Many countries have used this method to articulate an effective and appropriate national response to climate change.

This Guidebook responds to the needs of countries to have a clear approach to support the implementation of national climate targets in the context of sustainable development that duly accounts for their national circumstances, capacities and resources.

Between 2008 and 2024, 60 investment flow and financial flow assessments were conducted worldwide, with more than 1,000 national stakeholders engaged in the technical and political aspects of the assessments. Since the adoption of the Paris Agreement and the development of NDCs, the methodology has helped countries utilize financial assessments to develop a pathway to NDC implementation.

While this methodology was first developed in 2008, an update has taken place in 2025. This Guidebook is a living document, which will continue to be improved based upon the experiences of those using it. Over the years, the methodology to carry out financial assessments to address climate change has been continually reviewed and updated regarding its user friendliness, feasibility of implementation and sectoral scope. Comments are invited. Please send feedback to Susanne Olbrisch ([susanne.olbrisch@undp.org](mailto:susanne.olbrisch@undp.org)).

For more information, visit <https://climatepromise.undp.org/tags/investment-and-financial-flows-assessments>.

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# List of acronyms and abbreviations

<b>BAU</b>	Business-as-usual
<b>BS</b>	Baseline scenario
<b>CBD</b>	Convention on Biological Diversity
<b>CO<sub>2</sub></b>	Carbon dioxide
<b>FDI</b>	Foreign direct investment
<b>FF</b>	Financial Flow
<b>GCF</b>	Green Climate Fund
<b>GDP</b>	Gross domestic product
<b>GEF</b>	Global Environment Facility
<b>GHG</b>	Greenhouse gas
<b>IF</b>	Investment Flow
<b>IMF</b>	International Monetary Fund
<b>IPCC</b>	Intergovernmental Panel on Climate Change
<b>ISIC</b>	International Standard Industrial Classification
<b>LPG</b>	Liquid petroleum gas
<b>LT-LEDS</b>	Long-term Low-Emission Development Strategy
<b>LULUCF</b>	Land Use, Land-Use Change and Forestry
<b>NAP</b>	National Adaptation Plan
<b>NDC</b>	Nationally Determined Contribution
<b>NGO</b>	Non-governmental organization
<b>O&amp;M</b>	Operation and maintenance
<b>ODA</b>	Official Development Assistance
<b>OECD</b>	Organisation for Economic Co-operation and Development
<b>REDD</b>	Reducing Emissions from Deforestation and Forest Degradation in Developing Countries
<b>SNA</b>	System of National Accounts
<b>UN FAO</b>	United Nations Food and Agriculture Organization
<b>UNDP</b>	United Nations Development Programme
<b>UNFCCC</b>	United Nations Framework Convention on Climate Change
<b>V&amp;A</b>	Vulnerability and adaptation
<b>WHO</b>	World Health Organization

Chapters I and II of this guide provide methodology on how to carry out a financial assessment. This chapter provides additional information needed to carry out a financial assessment in the **health sector**. To avoid repetition, some of the information provided in Chapter II that is relevant to all sectors is not included in this chapter. Careful reading of Chapter II before this chapter is highly recommended.

## 10.1 Introduction

According to the World Health Organization (WHO), climate change affects, in profoundly adverse ways, some of the most fundamental determinants of health: food, air and water.<sup>1</sup> According to WHO, a “warmer and more variable climate threatens to lead to higher levels of some air pollutants, increase transmission of diseases through unclean water and through contaminated food, to compromise agricultural production in some of the least developed countries and increase the hazards of extreme weather.”<sup>2</sup>

Climate change also creates new challenges for the control of infectious diseases. Furthermore, WHO highlights that stress on the climate system and its impacts, such as rising surface temperatures, increasingly frequent floods and droughts and changes in natural ecosystems, are inextricably linked to the health of human societies. WHO reports that deaths and illness due to extreme heat are overloading already strained health systems and air pollution kills over 7 million people per year, leading to asthma, ischemic heart disease, and stroke which are major killers of people across all nations.<sup>3</sup> The health impacts of climate change will be particularly challenging for developing countries where systems are already under stress.

Health systems are comprised of all organizations, institutions and resources devoted to producing actions whose primary intent is to maintain and improve human health. This broad definition comprises such traditional public health activities as health promotion and disease prevention as well as other health enhancing interventions that include those influence determinants of health, related to provision of clean air and water, sufficient food and adequate shelter, to ensure humans are free from disease. The direct health-improving activities comprise a broad range of functions from service provision to resource generation, financing and governance of the system.

Health sector activities include disease prevention, health promotion, treatment and the application of medical, paramedical and nursing knowledge and technology. National health expenditure encompasses the expenditures to carry out those activities. This is done by utilizing health worker resources, infrastructures, health commodities (such as equipment and medicines), supplies, information, transport and logistics, communications and financing.

Table 10.1 provides a list of the functions of the health sector and describes the activities under each set of functions. It is based on the “Guide to producing national health accounts,”<sup>4</sup> which adapts the International Classification of Health Accounts published in “A System of Health Accounts”<sup>5</sup> by the Organisation for Economic Cooperation and Development (OECD).<sup>6</sup>

<sup>1</sup> Climate Change and Health, Report by the Secretariat, EB122/4, 122nd Session, Executive Board, WHO, 16 January 2008.

<sup>2</sup> WHO (2008). Protecting health from climate change, Summary of issues paper, World Health Day 2008.

<sup>3</sup> WHO (2024). [Quality criteria for integrating health into Nationally Determined Contributions \(NDCs\)](#).

<sup>4</sup> WHO, World Bank and U.S. Agency for International Development (2003). [Guide to producing National Health Accounts with special applications for low-income and middle-income countries](#). Geneva: WHO.

<sup>5</sup> OECD (2000). A System of Health Accounts. Manual, Version 1.0.

<sup>6</sup> The International Classification of Health Accounts classification of health care industries has refined the International Standard Industrial Classification (ISIC, Rev. 3, United Nations, 1990). More recently designed or revised classifications, such as the Central Product Classification, Version 1 (United Nations, 1998a) and the 1998 revision of the SNA 93 functional classifications, are also referred to in the International Classification of Health Accounts as the System of Health Accounts.

**Table 10.1: Health sector functions**

Health care function	Description
<b>Personal health care services and goods</b>	
<b>Services of curative care</b>	Cure of illness or provision of definitive treatment of injury; surgery; obstetric services; diagnostic or therapeutic procedures
<b>Services of rehabilitative care</b>	Medical and paramedical services delivered to patients during an episode of rehabilitative care, where the emphasis lies on improving the functional levels of the persons served and where the functional limitations are either due to a recent event of illness or injury or of a recurrent nature (regression or progression)
<b>Services of long-term nursing care</b>	Ongoing health and nursing care given to those who need assistance on a continuing basis due to chronic impairments and a reduced degree of independence and activities of daily living
<b>Ancillary services to health care</b>	A variety of services by paramedical or medical technical personnel, such as laboratory, diagnosis imaging and patient transport
<b>Medical goods dispensed to out-patients</b>	Goods and the services connected with dispensing, e.g., retail trade, fitting, maintaining and renting of medical goods and appliances
<b>Collective health care services</b>	
<b>Prevention and public health service</b>	Enhance the health status of the population
<b>Health administration and health insurance</b>	Provided by authorities and social security and private insurers, whose activities are the planning, management, regulation and collection of funds and handling of claims of the delivery system
<b>Health-related functions</b>	
<b>Capital formation</b>	Gross capital formation of domestic health care provider institutions
<b>Education and training</b>	Government and private provision of education and training of health personnel, including the administration, inspection or support of institutions providing education and training of health personnel
<b>Research and development</b>	Programmes directed towards the protection and improvement of human health, including research and development on food hygiene and nutrition and also on radiation for medical purposes, biochemical engineering, medical information, rationalization of treatment and pharmacology (including testing medicines and breeding of laboratory) and research related to epidemiology, prevention of industrial diseases and drug addiction
<b>Other health-related functions</b>	
<b>Food, hygiene and drinking water control</b>	
<b>Environmental health</b>	
<b>Related sectors/subsectors</b>	
<b>Pharmaceutical industry</b>	
<b>Retail, sale and other providers of medical goods.</b>	
<b>Insurance</b>	

Source: Adapted from section 8.2 Current sensibility and vulnerability, in Chapter 8, Human Health, Confalonieri, U., B. Menne, R. Akhtar, K.L. Ebi, M. Hauengue, R.S. Kovats, B. Revich and A. Woodward (2007). Human health. Climate Change 2007: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change, M.L. Parry, O.F. Canziani, J.P. Palutikof, P.J. van der Linden and C.E. Hanson, eds., Cambridge University Press, Cambridge, UK, pp. 391-431.









Health systems at large are one of the largest sectors of the world economy, with most countries spend between 5-12.5 percent of GDP<sup>7</sup> and employing about 65.1 million health workers worldwide.<sup>8</sup> There are, however, huge differences across countries in contributions and budgetary allocations to the health sector.

The methodological approach described in this chapter is focused on the required means to assess the IF and FF needed to prevent, minimize and alleviate climate change-related impacts on human health at the country level and develop adaptive responses to these impacts in the health sector.

## 10.2 Application of financial assessment methodology to adaptation in the health sector

This section describes how the financial assessment methodology described in Chapter II will be applied to adaptation in the health sector. Some of the information provided in Chapter II that is relevant to all sectors is not repeated here. The user should refer to Chapter II alongside reading this chapter.

As described in Chapter II, the financial assessment involves a series of steps, which are:

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- 
**Step 1.** Establish key parameters of the assessment.
  - 
**Step 2.** Compile historical IF, FF and O&M cost data (and subsidy cost data if included explicitly) and other input data for scenarios.
  - 
**Step 3.** Define baseline scenario.
  - 
**Step 4.** Identify annual IF, FF and O&M costs (and subsidy costs if included explicitly) for the baseline scenario.
  - 
**Step 5.** Define target scenario.
  - 
**Step 6.** Identify annual IF, FF and O&M costs (and subsidy costs if included explicitly) for the target scenario.
  - 
**Step 7.** Calculate the changes in IF, FF and O&M costs (and in subsidy costs if included explicitly) needed to implement target scenario.
  - 
**Step 8.** Identify policy implications.

<sup>7</sup> Esteban Ortiz-Ospina and Max Roser (2017) - "Healthcare Spending" Published online at OurWorldinData.org. Retrieved from: <https://ourworldindata.org/financing-healthcare>

<sup>8</sup> Boniol M, Kunjumen T, Nair TS, Siyam A, Campbell J, Diallo K. (2022). [The global health workforce stock and distribution in 2020 and 2030: a threat to equity and 'universal' health coverage?](#) BMJ Glob Health. Jun;7(6):e009316. doi: 10.1136/bmjgh-2022-009316. PMID: 35760437; PMCID: PMC9237893.

## Step 1.



### Establish key parameters of the assessment.

#### Define detailed scope of the sector.

Financial assessments help countries to identify the required financial shifts and increases to implement their national targets, such as the NDC and LT-LEDS. The scope will be identified based on the national target being assessed.

The decision on the scope needs to be appropriate to national circumstances at the health sector level, especially regarding data availability and the national government entities in which data reside and related previous work undertaken in the health sector (e.g., National Communications, national health strategies and plans, long-term health interventions in preventive and curative actions, vulnerability assessments and National Adaptation Plans).

Some adaptation measures in the health sector will likely result in mitigation benefits, e.g., such as improved cook stoves may reduce respiratory diseases while decreasing emissions. These benefits should be assessed qualitatively. And some mitigation measures, such as clean energy sources for power generation, transport, home heating, cooking and lighting and urban planning measures enabling an efficient public transport, have important health co-benefits.

#### Specify base year and assessment period.

The most recent year for which historical data is available is recommended as the base year (e.g., 2025). The assessment period should match the time horizon of the target being assessed. NDCs often have a time horizon until 2030, LT-LEDS often until 2050. The assessment period should have a considerable length to be sufficiently able to take into account the long lifetimes of infrastructure in the sector.

#### Identify the target to be assessed and adaptation measures.

In this step, a set of adaptation options to be part of the IF and FF assessment must be identified based on the national target being assessed (NDC, LT-LEDS, other). National targets being assessed are often general and visionary and not detailed enough to directly use them for a financial assessment. Therefore, the first step is to break down the overall national target into concrete measures and steps of action that can be used for the financial assessment.

Breaking down the national target includes technical and political considerations. Therefore, it is key to do this step in close consultation with national policymakers to ensure their ownership of and buy in to the measures being identified. The selection of options should also consider relevant previous work in the health sector, including national and sectoral plans, National Communications, National Adaptation Plans and National Adaptation Programmes of Action. The selected adaptation options need to be specific and broken down into concrete activities so that IF and FF and O&M costs can be identified in Steps 4 and 6.

According to the Intergovernmental Panel on Climate Change (IPCC), global warming will have direct impacts on health including those due to changes in exposure to weather extremes (e.g., heat and cold waves), increases in the intensity and frequency of other extreme weather events (e.g., floods, storm-surges, cyclones, droughts) and increased production of air pollutants and aeroallergens (spores and moulds). Typical climate change impacts on health include diseases that are physiologically linked with heat (e.g., cardiovascular disease) and infectious diseases (e.g., vector-borne diseases and some diarrhoeal diseases).

Other climate change impacts are more indirect, such as health threats due to extreme weather or rising sea levels. Acting via such less direct mechanisms, climate change will affect the transmission of infectious diseases (especially water-, food- and vector-borne diseases) and have strong intense impacts on regional food productivity. Table 10.2 illustrates some of the multiple pathways by which climate change affects health.

**Table 10.2: Pathways by which climate change affects health**

Weather/climate factors	Adverse health effects	Range of impacts and health outcomes
<b>Thermal extremes: heat waves, cold waves</b>	Heat-related illnesses and deaths	Increased heat-related deaths and illnesses Increases in mortality in vulnerable groups
<b>Extreme weather events: wind, storm, floods, cyclones</b>	Extreme weather-related health effects Storm surge-related drowning and injuries Health problems of displaced populations	Deaths and injuries Infectious diseases Toxic contamination Increased risk of water-related diseases Increases in respiratory and diarrhoeal diseases Effects on mental health, including mental health consequences of social, economic and demographic dislocations Injuries and increased risk of disease due to migration and crowding
<b>Drought, nutrition and food security</b>	Malnutrition	Deaths, malnutrition (undernutrition, protein-energy malnutrition and/or micronutrient deficiencies), infectious diseases and respiratory diseases
<b>Changes in rainfall, water availability and quality</b>	<b>Infectious diseases:</b> Water-related diseases, including both	Water-related diseases, including both water-borne (ingested) and water-washed diseases (caused by lack of hygiene)
<b>Climate change impacts on food production</b>	Food-borne diseases Vector- and rodent-borne diseases and other infectious diseases	Food-borne infectious diseases (including those due to salmonella, campylobacter and many other microbes) Malaria, filariasis, dengue, yellow fever, West Nile fever Leishmaniasis Chagas disease Lyme disease, tick-borne encephalitis African trypanosomiasis Onchocerciasis
<b>Air quality related diseases</b>	Air pollution-related health effects	Aggravation of cardiovascular and respiratory diseases from worsening air quality
<b>Changes in aeroallergens (spores, pollens),</b>	Allergic diseases	Exacerbation of asthma and other allergic respiratory diseases
<b>Terrestrial changes</b>		Risk of infectious diseases because of new geographic ranges and activity of disease-carrying animals, insects and infective parasites (such as those causing malaria)
<b>Altered marine ecology</b>		Changes in incidence of food poisoning from toxic algae
<b>Saltwater encroachment in coastal aquifers</b>		Greater risk of intestinal illnesses from inadequate water supplies

Sources: Adapted from section 8.2 Current sensibility and vulnerability, in Chapter 8, Human Health, Confalonieri, U., *et al.* (2007). Human health. Climate Change 2007: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change, M.L. Parry, *et al.*, pp. 391-431 and Paatz, *et al.* (2000).

The IPCC identified rebuilding public health infrastructure as “the most important, cost-effective and urgently needed” adaptation strategy. Decisions about public health measures indirectly related to climate change, such as sanitation and water treatment, may also have a profound influence on health consequences associated with climate change.

Having considered the adverse health effects described in Table 10.2, it is now possible to systematically refine the adaptation measures. Table 10.3 presents general adaptation options.

**Table 10.3: General adaptation options in the health sector**

Options	Examples of potential activities and expenditures
<b>Disease surveillance</b>	Climate-change health risk assessments and monitoring Analysis Improved diagnosis of vector-borne diseases Vector monitoring and control
<b>Disease control</b>	Vaccination programmes
<b>Prevention</b>	
<b>Primary prevention:</b> Intervention implemented before evidence of disease or injury	Avoiding hazardous exposure Removing causative risk factors Protecting individuals to limit exposure to the hazard Examples: bed nets supplied to populations at risk of exposure to malaria; early warning systems, such as extreme heat health warnings and famine early warnings
<b>Secondary prevention:</b> Intervention implemented after disease has begun, but before it is symptomatic, by early detection or screening and sub-sequent treatment that averts full progression to disease	Enhancing monitoring and surveillance Improving disaster response and recovery Strengthening the public health system’s ability to respond quickly to disease outbreaks
<b>Tertiary prevention:</b> Aimed at minimizing the adverse effects of an already present disease or injury	Better treatment of heat stroke Improved diagnosis of vector-borne diseases
<b>Protective technologies</b>	New drugs New vaccines Warning systems Mobile laboratories Computerized disease surveillance New pesticides Data capture systems
<b>Weather forecasting and warning systems</b>	
<b>Emergency management and disaster preparedness</b>	Links with disaster management and risk reduction planning

**Table 10.3: General adaptation options in the health sector (*continued*)**

Options	Examples of potential activities and expenditures
<b>Infrastructure expansion and adequateness</b>	
<b>Dedicated health infrastructure</b>	Infrastructure development Primary health care infrastructure Hospitals Laboratories
<b>Prevention and public health service infrastructure</b>	Water supply systems Water treatment Waste water treatment Sanitation facilities Housing Building insulation Storm shelters Flood management structures
<b>Public health education</b>	
<b>Legislation and administration</b>	Changes in legislation, standards and procedures
<b>Research</b>	Develop and test early warning systems Develop and/or operate: <ul style="list-style-type: none"> <li>➤ GIS software</li> <li>➤ Geo-referencing data</li> <li>➤ Risk assessment</li> <li>➤ Epidemiological research</li> </ul>
<b>Training</b>	Programmes on emergency management Programmes on information systems

Sources: Adapted from Patz JA, McGeehin M.A., Bernard S.M., *et al.* (2000). [The potential health impacts of climate variability and climate change for the United States](#): Executive Summary of the report of the health sector of the US National Assessment. Environmental Health Perspectives. Volume 108, Number 4.;

Adapted from UNFCCC Secretariat (2008). [Compendium of methods and tools to evaluate impacts of, and vulnerability and adaptation to, climate change](#).

## Select analytical approach.

Analytical options available for a financial assessment in the health sector range from simple spreadsheet models to health intervention models. Tools have been developed to address scarcity of data, uncertainty and multiple stresses. Infectious disease transmission patterns, for example, are affected by many factors other than climate, making it challenging to relate disease outbreaks solely to climatic variations, while environmental, biological and societal aspects play a role as well.

Sectoral models, grounded in historical data, can be selected that cover each of the impacts included in the assessment to calculate plausible future trends in the health sector over the selected assessment period, incorporate the identified adaptation measures and project streams of annual IF and FF by entity and source.

If suitable models are not available, a health strategy, plan or projection of trends specific to the sector can be used as the basis for the scenarios. The plan or projection chosen (e.g., a scenario from a National Communication) should describe anticipated changes in the sector over the selected assessment period in sufficient detail to identify the required financial shifts and increases to implement the national target.

Modelling health impacts is complex as there are different types of evidence for health effects. These include: health impacts of individual extreme events (thermal extremes, floods, storms, droughts); spatial studies (in which climate is an explanatory variable in the distribution of the disease or the disease vector); temporal studies (short- and long-term) to detect early effects of climate change; and experimental laboratory and field studies of vector, pathogen and plant biology.<sup>9</sup>

Quantifying the relationship between climate and each health outcome involves a statistical analysis of the effect of past variations in climate on disease that yields an estimated change in disease rates or the probability of disease occurrence for each unit change in the climate variable. A methodological approach helps quantify health impacts, for example from temperature-related deaths, deaths and injuries from flooding and vector-borne diseases, such as malaria and dengue and diarrhoeal disease.

Table 10.4 includes a list of health models and methods to address the complex interrelations between health and climate change.

**Table 10.4: Health sector models and methods**

<b>Modelling approaches</b>	
<b>Models of data</b>	
<b>Empirical statistical models</b>	<p>Extrapolation of climate/disease relationship in time and space: change of distribution of vectors with change in climate</p> <p>Temperature-mortality</p> <p>Temperature–diarrhoeal disease</p> <p>Rainfall-flood-death</p> <p>Temperature/rainfall-dengue, malaria (spatial correlations)</p>
<b>Economic models</b>	<p>Models for the likely effect of climate change on measurable economic quantities, such as income.</p>
<b>Models of processes</b>	
<b>Process-based models (mechanistic or biological)</b>	<p>Theoretically based models of universal application:</p> <ul style="list-style-type: none"> <li>➤ Vector borne disease forecasting with a model based on vectorial capacity</li> <li>➤ Malaria/vectorial capacity</li> <li>➤ Heat budget models</li> </ul>

<sup>9</sup> Kovats, R. Sari, Campbell-Lendrum, Diarmid and Matthies, Franziska (2005). "Climate Change and Human Health: Estimating Avoidable Deaths and Disease." Risk Analysis, Vol. 25, No. 6, pp. 1409-1418, December 2005.

**Table 10.4: Health sector models and methods (continued)**

Modelling approaches	
<b>Models of processes</b>	
<b>Epidemiological models</b>	<p>Susceptible population:</p> <ul style="list-style-type: none"> <li>› Exposed</li> <li>› Infectious population</li> <li>› Recovered population</li> </ul>
<b>Integrated assessment models</b>	<p>Integrated, systems-based mathematical models that concentrate on the interactions and feedback mechanisms between different subsystems of the cause-effect chain rather than focusing on each subsystem in isolation.</p> <p>Systemic multidisciplinary links of process-based models (e.g., impact of climate change on the transmission potential of malaria mosquito and malaria prevalence).</p>
<b>Specific health effects</b>	
<b>Temperature-related illness and deaths</b>	Regression model. Time series studies of daily mortality, following methods developed for air pollution studies. Combined with mapping of heat stress indicators.
<b>Extreme weather events</b>	Epidemiological models and mapping.
<b>Air pollution</b>	Time series models
<b>Vector-borne diseases</b>	<ul style="list-style-type: none"> <li>› Mapping; GIS</li> <li>› Biological models; Statistical models</li> <li>› Different methods for estimating future health impacts should be employed if these diseases are already present or not.</li> <li>› Malaria: Malaria models can be used to estimate the populations at risk for a range of climate and population scenarios.</li> <li>› MIASMA model (Martens <i>et al.</i>) links GCM based climate change scenarios with the formula for the basic reproduction rate to calculate the transmission potential of a region where malaria mosquitoes are present.</li> <li>› Dengue: CIMSIM is a dynamic life-table simulation entomological model that produces mean-value estimates of various parameters for all cohorts of a single species of Aedes mosquito. DENSIM is the corresponding account of the dynamics of a human population driven by country- and age-specific birth and death rates.</li> </ul>
<b>Water- and food-borne diseases</b>	Diarrhoeal disease: Time series analysis.

## Step 2.



### Compile historical IF, FF, O&M cost data (and subsidy cost data if included explicitly) and other input data for scenarios.

Data should be compiled for each investment type. It should be annual, disaggregated by investment entity and by source and divided into investment flows and financial flows.

### Compile historical annual IF and FF data, disaggregated by investment entity and source.

Historical IF and FF data are needed to provide a basis from which to project future scenarios. At a minimum, countries should collect at least three years of historical IF and FF data (i.e., for the base year and two years during the previous decade). Ideally, countries would collect ten years of historical data, i.e., for the base year and the previous nine years. Data should be disaggregated by year, source and type.

Historical IF and FF sources at the national and sub-national level should be considered for the assessment. Sources could include data from national accounts, expenditure reports of the different ministries (e.g., ministry of health, ministry of finance), social security institutions, other governmental agencies, statistical yearbooks and health-specific statistical information from the national statistics agency. Additionally, information may be available from international funding agencies, national reports of health-related entities, such as the private medical insurance and pharmaceutical industries, health research centres and academic institutions, household expenditure surveys and censuses.

[Statistics of health expenditures](#) are available from the OECD, which can contribute to the baseline for the assessment. National health accounts monitor resource flows in a country's health system and capture information on these resource flows, including financing sources, financing agents, providers, beneficiaries, functions and costs, by expressing the basic macro identities between expenditures, consumption plus investment, provision of goods and services and sources of financing, taxes plus payroll taxes and private disbursements.

Some international forms of national accounts will include health under categories such as "Education, health and social work, other community, social and personal services," which can make identifying specific investments in the health sector more difficult.

Additional health sector data can be obtained from the sources below.

- › **WHO Statistical Information System.** This brings together core health statistics for the 194 WHO Member States (as of January 2025), comprising more than 70 indicators. The data are also published annually in the *World Health Statistics Report*.
- › **WHO Health Accounts** website provides evidence to monitor trends in: public and private health spending, including the level and composition of health expenditures; and different health care activities, providers, diseases, population groups and regions in a country. This information helps when formulating national strategies for health financing and to mobilize funds for health.
- › **WHO Communicable Disease Global Atlas,** This Atlas brings together standardized data for infectious diseases at the country, regional and global levels. The data analysis is supported by information on demography, socio-economic conditions and environmental factors. The Atlas acknowledges a range of determinants that influence infectious disease transmission.

- **World Bank Health, Nutrition and Population database**. This database contains statistics on health, nutrition and population.
- Further useful data may be found here:
  - [Global Tuberculosis Database](#)
  - [Global Atlas of the Health Workforce](#)
  - [FluNet](#)
  - [DengueNet](#)
  - [RabNet](#)
  - [Global Alliance for the Elimination of Blinding Trachoma](#)
  - [Project Atlas: Resources for Mental Health and Neurological Disorders](#)
  - [Global Information System on Alcohol and Health](#)
  - Statistics from WHO regional offices for [Africa](#), [Asia](#), [Latin America and the Caribbean](#)
  - [The WHO Global InfoBase](#) (a data warehouse that collects and stores information on chronic diseases and their risk factors for all WHO member states).

Information should be collected, disaggregated by IF, FF and per year for each investment type, according to the policies, measures and actions of the historical period, as explained in Chapter II and be captured in a table as the table 2.3 ‘One Year of Historical investment and financial flows data’.

To facilitate that task, Table 10.5 lists different investment types in the health sector.

**Table 10.5: Examples of investment flows and financial flows in the health sector**

Type of IF and FF in the health sector	IF (2025 US\$ or national currency)	FF (2025 US\$ or national currency)
<b>Public health management</b>		
Health policy, planning and management		
Use of scientific evidence in the formulation and implementation of public health policy		X
Public health and health systems research		
International collaboration and cooperation in health		
<b>Public health legislation and regulations</b>		
Enacting legislation, regulations and administrative procedures		
Health inspection and licensing		X
Enforcement of health legislation, regulations and administrative cross-sectoral procedures		
<b>Monitoring the health situation</b>		X
<b>Prevention, surveillance and control of communicable and non-communicable diseases</b>		
Immunization		
Disease outbreak control		X
Disease surveillance		
Prevention of injury		
<b>Personal health care for vulnerable and high-risk populations</b>		
Maternal health care		X
Infant and child care		

**Table 10.5: Examples of investment flows and financial flows in the health sector**  
(continued)

Type of IF and FF in the health sector	IF (2025 US\$ or national currency)	FF (2025 US\$ or national currency)
<b>Occupational health</b>		X
<b>Specific public health services</b>		
School health services		
Emergency disaster services		X
Public health laboratory services		
<b>Health promotion</b>		X
<b>Infrastructure</b>		
Hospitals		
Nursing and health care facilities		
Primary health care infrastructure		
Other buildings	X	
Medical and diagnostic laboratories		
Ambulance services and movable equipment		
Communications		
Blood and organ banks		
<b>Technology</b>		
Drugs		
Pollution control methods		
Vector control technologies		
New vaccines	X	
Warning systems		
Mobile laboratories		
Computerized disease surveillance		
New pesticides		
<b>Equipment</b>		
Hospital equipment for:		
a. laboratories	X	
b. health care facilities		
<b>Training</b>		X
<b>Research</b>		
Food hygiene and nutrition		
Radiation used for medical purposes		
Biochemical engineering		
Rationalization of treatment and pharmacology		X
Epidemiology		
Prevention of industrial diseases		
Drug addiction		

Note: X Indicates likely type of flow.

Investment entities in national health accounts are the institutions and entities that pay for or purchase health care. Investment entities include institutions that pool health resources collected from different sources, as well as entities (such as households and corporations) that pay directly for health care from their own resources, as shown in Table 10.6.

**Table 10.6: Investment entities and sources of investment flows and financial flows in the health system**

Investment entity	Source of funds	Examples of investment entities
<b>Households</b>	Domestic	Private households' out-of-pocket payment
<b>Corporations</b>	Domestic	Private social insurance Other private insurance
	Foreign	Firms and corporations (other than health insurance) Non-profit institutions serving households (other than social insurance) their private insurance
<b>Governments</b>	Domestic (Budgetary)	General government Territorial government
	Foreign (Borrowing, Bilateral foreign aid, Multilateral foreign aid)	Central government State/provincial government Local/municipal government Social security funds

## Compile annual historical O&M data, disaggregated by investment entity and source.

Historical O&M data are needed to provide a basis to project future O&M costs. Annual O&M costs for the physical assets that are in operation during the historical period, and for assets purchased prior to the historical period but that are still in operation, should be collected. Information about the expected lifetimes of the assets in operation during the historical period, and annual fluctuations in O&M costs, also need to be collected.

The O&M data for assets purchased during the historical period should be tracked separately from the O&M data for assets purchased before the historical period so that the total costs of assets purchased during the historical period can be identified. Table 2.4 'Template for three years of historical O&M cost data for an investment flow in 2023' in Chapter II illustrates the disaggregation of three years of annual historical O&M cost data for an asset.

The O&M data may reside in the same locations as IF and FF data (e.g., national accounts, ministry records and plans, industry records, statistical agencies, utilities, research institutions). If such data are not available, countries can:

- adopt O&M cost data from similar assets in other countries and adjust the O&M data to in-country production and consumption rates; or
- derive estimates from proportional relationships between O&M costs and investment flows (e.g. 10 percent, 25 percent or 75 percent), using either standard assumptions about proportional relationships or proportional relationships observed in other countries.

The International Monetary Fund (IMF) [Government Finance Statistics Manual 2014](#) contains an economic classification of expenses and the system of national accounts uses the same breakdown. These and similar categories have been used by governments as a standard framework for describing public expenditures by entities, such as the ministry of health or social security fund. Examples of O&M costs are provided in Chapter II.

## Compile other input data for scenarios.

The characterization of the scenarios and derivation of annual costs for the scenarios will require other historical and non-historical data relevant to the health sector. Typical information required for the scenario will include socio-economic information e.g., population and economic growth projections, demand forecasts for health services, etc.

### Step 3.



### Define baseline scenario.

This step entails characterizing the health sector over the assessment period under business-as-usual conditions, providing a description of what will occur in the sector in the absence of additional policies to address climate change.

Historical data will be extrapolated for the baseline scenario, with the understanding that the historical trends will persist. This may depict a scenario in which the disease situation is unstable as a consequence of multi-dimensional changes, including population growth, urbanization, intensive farming practices and environmental degradation. It may also consider that new diseases may emerge at a faster rate, particularly with globalization trends (high mobility, economic interdependence, electronic interconnectedness) creating increasing opportunities for the international spread of infectious agents and their vectors in a world characterized by expanding vulnerability and health hazards across countries. Adaptation measures that a country undertook during the historic period are included in the baseline scenario.

An analytical model can be used to develop and define a baseline scenario. Otherwise, health sector plans, national health strategies, diverse specific programmes and trends can be used as the basis of a projection. The role of the private sector and its decision-making patterns, including the potential evolution of economic conditions, demand side considerations and evolution of the national economy, should also be taken into account when defining the baseline scenario.

## Step 4.



**Identify annual IF, FF and O&M costs (and subsidy costs if included explicitly) for the baseline scenario.**

### **Identify annual IF and FF for each investment type, disaggregated by investment entity and funding source.**

The IF and FF for each activity that is part of the baseline scenario will be identified. The source of these data, or method of derivation, will depend on the analytical approach to be used. The IF and FF values may be the output from a model, might be obtained from a planning document or from several documents, or might be derived from the historical data. If a model is not used, information may be available from investment entities, relevant government ministries, statistical agencies and research institutions.

Financial values will be captured as in Table 2.6: 'Baseline scenario: *cumulative* investment and financial flows and O&M' and Table 2.7: 'Baseline scenario: *annual* investment and financial flows and O&M' in Chapter II.

### **Identify the annual O&M costs for each IF, disaggregated by investment entity and source.**

As with IF and FF data, O&M costs may be from the output of a model, obtained from planning documents or derived from the historical data. If a model is not used, information may be available from investment entities, relevant government ministries, statistical agencies and from research institutions.

## Step 5.



### Define target scenario.

This step entails describing what is likely to occur in the sector over the assessment period in the presence of additional and scaled up policies and measures to address climate change in the health sector.

The policies and measures will be based on the national target being assessed (NDC, LT-LEDS, other) and should be considered within the context of broader public health concerns, such as population growth and demographic change, poverty, availability of health care and public health infrastructure, technological change, sanitation, nutritional status of the population and environmental degradation. These conditions constitute the basis to determine in the next step the nature, scale and timing of each IF and FF to implement the measures.

The goal of the adaptation measures is to reduce adverse climate change impacts on the health sector. In this context, it is necessary to strengthen the adaptive capacity of institutions and individuals to adjust to the potential impacts. Improved weather warning systems and buildings and infrastructure, for example, all can be considered measures to reduce human health risks under changing climatic conditions.

When considering the target scenario, it should be determined whether it will be necessary to modify or expand existing measures, reinstate measures that have been abandoned and/or consider new risks to the population. The target scenario would then include all measures and activities required to implement the national target on the health sector.

The clearer and more complete the measures and activities are in the target scenario, the more accurate the financial assessment will be for the health sector.

## Step 6.



### Identify annual IF, FF, O&M costs (and subsidy costs if included) for the target scenario.

#### Identify annual IF and FF for each investment type, disaggregated by investment entity and funding source.

The source of these data, or method of derivation, will depend on the analytical approach, the scope adopted for the sector and the types of investment and entities that are relevant to the health sector.

Financial values will be captured as in Table 2.8: 'Target scenario: *cumulative* investment and financial flows and O&M' and Table 2.9: 'Target scenario: *annual* investment and financial flows and O&M' in Chapter II.

#### Identify annual O&M costs for each IF, disaggregated by investment entity and funding source.

The output of this step will be a stream of annual O&M costs for each investment type for the entire assessment period, disaggregated by investment entity and source.

**Step 7.**

## Calculate the changes in IF, FF and O&M costs (and in subsidy costs if included explicitly) needed to implement target scenario.

The shifts and increases in IF, FF and O&M costs needed to implement the target scenario in the health sector are calculated according to the general methodology as outlined in Step 7 in Chapter II. The changes in IF and FF are obtained by subtracting the values of the baseline scenario from those of the target scenario.

The two objectives of this step are to determine: 1) how *cumulative* IF, FF and O&M costs would change; and 2) how *annual* IF, FF and O&M costs would change. If subsidy costs are included explicitly in the assessment, the changes in subsidy costs will be calculated.

The accompanying volume on reporting (Reporting Guidelines for the Assessment of Investment and Financial Flows to Address Climate Change) and associated excel file 'Worksheets for scenario calculations' contain worksheets that can be used for capturing and processing information and to perform the calculations.

**Step 8.**

## Identify policy implications.

By looking at the results of Step 7, those investment entities and funding sources that are responsible for the largest shifts and increases in IF, FF and O&M can be identified. Based on this, policies need to be formulated to induce the relevant entities to implement the measures and incur the related IF and FF. When screening policy options, social, economic and environmental benefits should be acknowledged qualitatively.

This step should allow the formulation and implementation of appropriate policies at the national and sub-national levels, considering the broader view of vulnerability patterns, according to socio-economic conditions, and providing insights into the processes that cause and exacerbate vulnerability.



United Nations Development Programme  
304 East 45th Street, New York, NY 10017

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