

**Goal of Approach:****Approach: Central Agency's study of the Economic of Climate Change for Malaysia: Water Resources Sector**

Main Objective: To assess the economics cost and benefits of adaptation measures for the impacts of climate change in the water sector of floods and drought-water supply

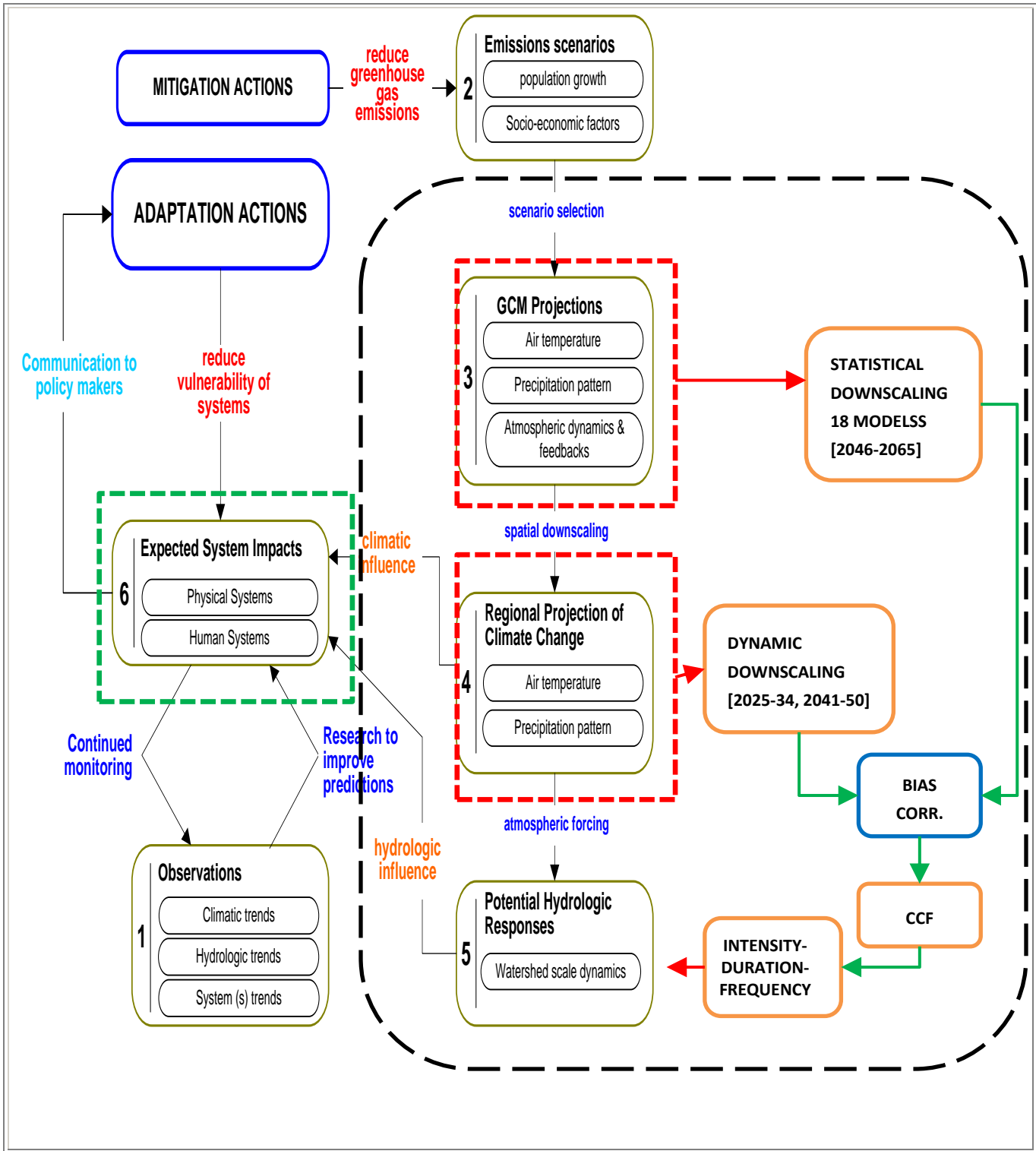
**Input provided by: NAHRIM, Malaysia**

**Main elements of the implementation strategy**

An analysis of temperature records in Malaysia shows the warming rate of mean surface temperature increased ranging from 0.6°C to 1.2°C per 50 years, consistent with global temperature trends (MMD, 2009). Observations in rainfall intensity for years 2000 to 2007 shows that it exceeds the amount recorded in the years 1971 to 1980 which was previously the highest record. An increase has been observed in annual maximum rainfall intensity of 17% (to 122mm/hr) and 29% (to 133mm/hr) for 1 hour and 3 hour intensity respectively. Under the doubling of atmospheric CO<sub>2</sub>, the mean temperature in Malaysia is projected to rise in the range of 1.5°C to 2.0°C, and rainfall depth is to change in the range of -6% to +11%. A climate change modeling and projection study conducted for Malaysia indicates a possible increase in inter-annual and intra-seasonal variability with increased hydrologic extremes, with potential flood and water supply problems (NAHRIM, 2006).

Thus in line with the National Policy on Climate Change, National Water Resources Policy and Malaysia's Second National Communication (NC2) to UNFCCC, in overall, a prerequisite to economic analysis in terms of estimation of cost of adaptation to climate change for water resources sector is to use scientific approach by means of climate change projection data in specific time horizon. The analysis will include key components of climate change projection data such as rainfall, temperature and evapotranspiration based on time horizon to 2050. Due to varying climate change impacts, selecting the most impacted vulnerable areas in one or two locations which is specifically related to drought (water supply) and floods is required.

The main components of the study for the water resources sector are: (1) analysis and detailed modelling for water resources (floods and droughts) to examine structural integrity of existing or near future proposed floods related infrastructures at the protection level of 100-year average recurrence interval (ARI) up to time horizon of 2050; (2) analysis for drought and water supply: to carry out water resources (yield) and water supply modelling which will include projected water demand up to segmented time horizon of 2050; and (3) provide and translate water resources modelling output (data and information) for economic analysis. Derivation of climate change (rainfall) 'load' factor is conducted prior to the analysis and detailed modelling. The framework of climate change adaptation for the water resources study is generalized in the dotted box below:



**Targeted beneficiaries**

Based on this micro analysis of climate change impacts on the water resources sector, the expected output should be able to generalize the overall impacts and economic implications for the whole country

### **Any significant lessons learned**

(1) Integration thinking between various sectors and stakeholders, and translating hydrological findings for economic analysis, policy and strategy makers are amongst the challenges need to be addressed.

(2) to integrate disaster risk management and climate change adaptation at planning and implementation stage so that it can minimize the impacts of water hazards.

### **Resource requirements**

Data used: (1) downscaled projected climate data from Global Climate Models (GCMs) and output projection climate change data from Regional Hydroclimate Model for Peninsular Malaysia (RegHCM) using the IPCC Special Report on Emissions Scenarios (SRES) emissions scenario A1B and historical observed data from Department of Irrigation and Drainage Malaysia (DID); (2) Geospatial data;

### **Potential for replication or scaling-up**

The study/analysis on economic of adaptation to climate change in the water resources sector of floods and droughts-water supply is currently carried out at site specific (local) level. Potentially it could be used for climate change impact analysis, adaptation and economic implications at national level

### **Any additional information**

Reference:

MMD. 2009. *Scientific Report: Climate Change Scenarios for Malaysia 2001-2090*. Malaysian Meteorological Department, Malaysia.

NAHRIM. 2006. *Study of the Impact of Climate Change on the Hydrologic Regimes and Water Resources of Peninsular Malaysia – Final Report*. September 2006.