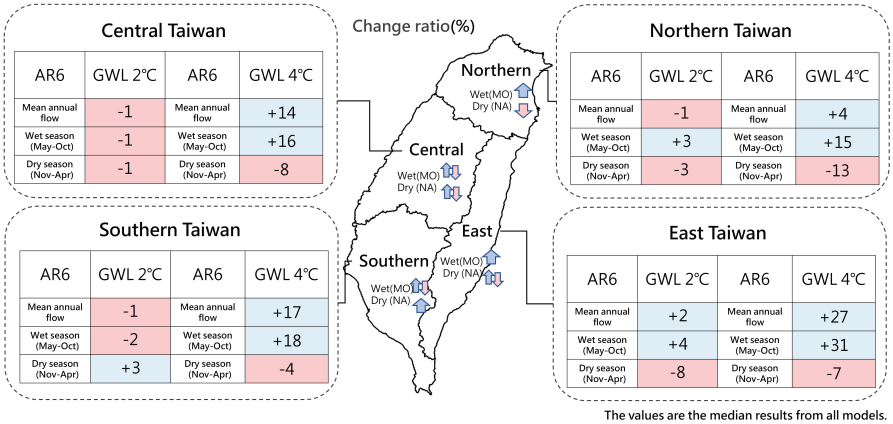
WATER RESOURCES

Taiwan's annual rainfall is 88.502 billion tons, although this abundance is unevenly distributed. After deducting losses due to evapotranspiration and runoff into the sea, the annual runoff volume is approximately 64.742 billion cubic meters. However, during the dry season (from November to April), the runoff volume is only 15.254 billion cubic meters, accounting for just 23.56% of the total, highlighting a significant disparity between wet and dry periods. This requires water resource management measures to ensure water security. Since 2017, many domestic studies in Taiwan have used AR5 or AR6 data to simulate changes in rainfall or runoff under different climate change scenarios. The analysis of Taiwan's four water resource regions (northern, central, southern, and eastern) shows that the annual runoff between -1% and +27%. During the wet season (May to October), runoff between -2% and +31%. In the dry season (November to April), rainfall shows a decreasing trend, runoff ranges between -13% and +3%. The increasing uneven distribution of water throughout the year will pose more challenges for future water resource supply. Under the AR5 RCP8.5 scenario, the current water supply in northern Taiwan may decrease by 3.3% to 6.0%, in central Taiwan by 3.9% to 4.3%, in southern Taiwan by 2.7%, while eastern Taiwan may experience unstable water supply during the dry season or periods of high turbidity.



Central Taiwan

AR6	GWL 2℃	AR6	GWL 4℃
Mean annual flow	-1	Mean annual flow	+14
Wet season (May-Oct)	-1	Wet season (May-Oct)	+16
Dry season (Nov-Apr)	-1	Dry season (Nov-Apr)	-8

Northern Taiwan

AR6	GWL 2℃	AR6	GWL 4℃
Mean annual flow	-1	Mean annual flow	+4
Wet season (May-Oct)	+3	Wet season (May-Oct)	+15
Dry season (Nov-Apr)	-3	Dry season (Nov-Apr)	-13

Southern Taiwan

AR6	GWL 2℃	AR6	GWL 4℃
Mean annual flow	-1	Mean annual flow	+17
Wet season (May-Oct)	-2	Wet season (May-Oct)	+18
Dry season (Nov-Apr)	+3	Dry season (Nov-Apr)	-4

East Taiwan

AR6	GWL 2℃	AR6	GWL 4℃
Mean annual flow	+2	Mean annual flow	+27
Wet season (May-Oct)	+4	Wet season (May-Oct)	+31
Dry season (Nov-Apr)	-8	Dry season (Nov-Apr)	-7

The values are the median results from all models.

Figure
Rate of Flow Changes Under the impacts of Climate Change (%)

Note:

The values in the table represent the median of all models (ranging from the 5th percentile to the 95th percentile). The GWL 2°C and GWL 4°C scenarios refer to the periods when global temperatures warm by 2°C and 4°C, respectively, and were compared with the baseline period (1995–2014). The number of models used was 86 for GWL 2°C and 26 for GWL 4°C. Because various models reach the GWL 2°C or 4°C at different times, the reference periods for GWL 2°C and GWL 4°C are between 2041–2060 (middle term) and 2081–2100 (long term), respectively. Runoff simulation is a nonlinear hydrological process influenced by different hydrological fluxes, such as evapotranspiration and groundwater outflow, which can cause the range of runoff changes to differ from that of precipitation changes.