

V. Climate Adaptation Measures and Achievements

The new term of the National Climate Change Adaptation Action Plan (2018-2022 NAP), which serves as a consecutive institutional framework proposed by the original National Climate Change Adaptation Plan (2013-2017 NAP), aims to "develop strategies to respond to climate change, improve adaptation capacity, strengthen resilience, and reduce vulnerability to the impact of climate change to ensure sustainable national development." NAP defines eight areas of adaptation and capacity building: disasters, critical infrastructures, water resources, land use, oceans and coasts, energy supply and industry, agricultural production and biological diversity, and health. NAP outlines a total of 125 action plans, among which 71 are designated as priority action plans, that promote Taiwan's adaptation work to reduce vulnerability, strengthen resilience, and align the Taiwan Sustainable Development Goals with the United Nations Sustainable Development Goals. The government will regularly disclose the climate change adaptation achievements and continue to adjust to the plan accordingly.

1. Key Performances of Climate Change Adaptation Capacity Building

Capacity building is the foundation of climate change adaptation work. The "National Climate Change Adaptation Action Plan (2018-2022 NAP)" is implemented through seven major promotion strategies and measures, including law, finance, science, education, emerging industries, and regional and local actions. The purpose of the seven major strategies and the key implementation performances of the current action plan are summarized below.

Promoting regulatory and policy transformation Key performances

Hosted : Environment Protection Administration (EPA) and other agencies.

Purpose : Review existing regulations and policies, and incorporate climate change factors to facilitate national climate change adaptation work.

- In 2018, the National Spatial Plan was announced and implemented as the country's highest statutory plan regulating spatial planning, and it was incorporated into climate change adaptation and territorial disaster prevention strategies.
- In 2019, the Executive Yuan approved the Integrated Guidelines for Improving the Resilience of Land for Flood Control and revised the *Water Act* by adding new regulations on runoff sharing and outflow control to strengthen the land's waterlogging tolerance.
- In 2020, the Council of Agriculture announced the *Agricultural Insurance Law* and established the Taiwan Agricultural Insurance Fund as an insurance mechanism, to reduce the forbearance of risk for the government and agricultural operators.
- In 2020, the Operational Guidelines for Geological Survey and Geological Safety Assessment in Geologically Sensitive Areas was revised to strengthen safety regulations for flood and water control.

- In 2020, the Executive Yuan approved six first-grade coastal conservation plans, while the Ministry of the Interior approved eight first-grade coastal conservation plans in 2021 and 2022.

Promoting fiscal and financial measures

Key performances

Hosted : Ministry of Finance (MOF), Financial Supervisory Commission (FSC), Committee of Agriculture (COA).

Purpose : In response to climate change, use financial instruments to raise funding from diversified sources, make the financial burden fair and use public resources effectively.

- Continue to conduct relevant courses through the Taiwan Academy of Banking and Finance and other relevant institutions to develop green and sustainable finance capabilities of financial practitioners to help them obtain information and understand the impact of climate change on the industry, assess risks and develop control and audit mechanisms, and help industries cope with climate change through investment and financing, green and sustainable financial products.
- To promote the development of sustainable finance and expand the scope of related bond products, the Financial Supervisory Commission has promoted in stages the sustainable development bond market. On May 18, 2021, the Taipei Exchange launched the social responsibility bond, which was integrated with the existing green and sustainability-linked bonds into a sustainable bond market. The issuance amount of sustainable bonds in 2021 was approximately NT\$105.83 billion, indicating a growth trend compared with the issuance amount in 2020 of about NT\$62.4 billion.

Complement scientific research, information and knowledge Key performances

Hosted : National Science and Technology Council (NSTC) and other agencies.

Purpose : Continuously update and localize information on future climate change projections, strengthen the link between research and policy, promote the application of value-added knowledge, and facilitate risk communication.

- Since 2018, the Ministry of Economic Affairs (MOEA) has successively planned risk assessment criteria applicable to the energy sector for climate shocks such as flooding, strong winds, high temperature, and slope disasters and advanced tools such as climate change maps and platforms to assess the risks of climate change to energy facilities.
- In 2019, the Ministry of Transportation and Communications (MOTC) completed the Provincial Highway Improvement Plan-Improvement of Highway Disaster Prevention and the Six-Year Plan for Railway Traffic Safety Improvement-Slope Lifecycle Maintenance and Management, to cope with the potential impact of heavy rains and frequent landslides on transportation facilities.
- In 2020, the Water Resources Agency, MOEA, completed the deployment of smart flood control networks in 12 counties and cities, combining the Taiwan Computing Cloud (TWCC) and Internet of Things (IoT) to achieve real-time monitoring and warning.
- In 2020, the National Science and Technology Council (NSTC) completed climate reconstruction for the past 40 years in Taiwan and continues to improve knowledge services and promote climate change information and knowledge dissemination through diverse activities.
- In 2021, the Taiwan Centers for Disease Control (CDC) launched a new version of the National Infectious Diseases Reporting System (NIDRS) to strengthen notification and surveillance of regional infectious diseases or cluster infections.

Implement education, advocacy and talent cultivation

Key performances

Hosted : Ministry of Education (MOE) and other agencies.

Purpose : Integrate community advocacy and education, combine climate change adaptation into daily life and build consensus on promoting climate change adaptation by the public.

- In 2016, the Ministry of Education (MOE) held the first Climate Change Innovation Competition to stimulate students' creativity in climate change adaptation and strengthen their problem-solving skills through practical implementation.
- In 2019, Environmental Education was included in the twelve-year basic education syllabus as one of the 19 essential topics, and the learning theme of "Climate Change" has been integrated into various curriculums.

Develop emerging industries on climate change

Key performances

Hosted : Ministry of Economic Affairs (MOEA) and other agencies

Purpose : Promote emerging industries such as climate services and create investment incentives to build a public-private partnership for climate change adaptation.

- Since 2017, the Water Resources Agency, MOEA, has implemented the Industry Innovation Development and Promotion Plans for Smart Water Management by applying smart management technology to urban flood control. In addition to building safe cities, it also promotes the integration and development of the water industry supply chain.
- Since 2017, the Central Weather Bureau of the Ministry of Transportation and Communications (MOTC) has been implementing the project for the Construction of the Taiwan Marine and Meteorology Disaster Prevention Information Service System. Through establishing nearshore and marine forecasting systems, information databases, and monitoring technologies, the project aims to strengthen ocean early warnings and safety, as well as promote the development of marine engineering and other

related industries.

- Since 2019, in response to the emphasis of the Task Force on Climate-related Financial Disclosures (TCFD) on this topic, the Industrial Development Bureau, MOEA, has held a series of lectures and adaptation demonstration projects annually to encourage the manufacturing industry to invest in climate change adaptation management.

Enhance regional adaptation capacity

Key performances

Hosted : Environmental Protection Administration (EPA) and other agencies

Purpose : Linking national disaster prevention and homeland security, promoting adaptation plans for high-risk areas, and implementing interdepartmental integration work.

- Since 2014, government agencies such as the National Development Council (NDC), the Ministry of the Interior (MOI), the Ministry of Economic Affairs (MOEA), the Ministry of Transportation and Communications (MOTC), the Council of Agriculture (COA), the Ministry of Health and Welfare (MOHW), and the Environmental Protection Administration (EPA) have continued to promote regional climate change adaptation plans in six high-risk areas in Taiwan, including: northern metropolitan districts, the upper reaches of the Dajia River and the Zhuoshui River, areas with significant land subsidence along the southwest coast, southern urban areas (climate change-related disease monitoring and management), the eastern coastal area of Yi-Lan, Hualian and Taitung counties, outlying island areas, etc.
- In 2019, the Taiwan Climate Change Projection Information and Adaptation Knowledge Platform (TCCIP) of the National Science and Technology Council, which is coordinated by the National Science and Technology Center for Disaster Reduction (NCDR), launched the third-generation climate adaptation service platform, providing various regional-scale climate change data for regional or county decision-making reference.

Strengthen local adaptation Key performances

Hosted : Environmental Protection Administration (EPA) ,other agencies and local government

Purpose : Strengthen communication and cooperation between local governments and central ministries to integrate and adjust policies and promote localization

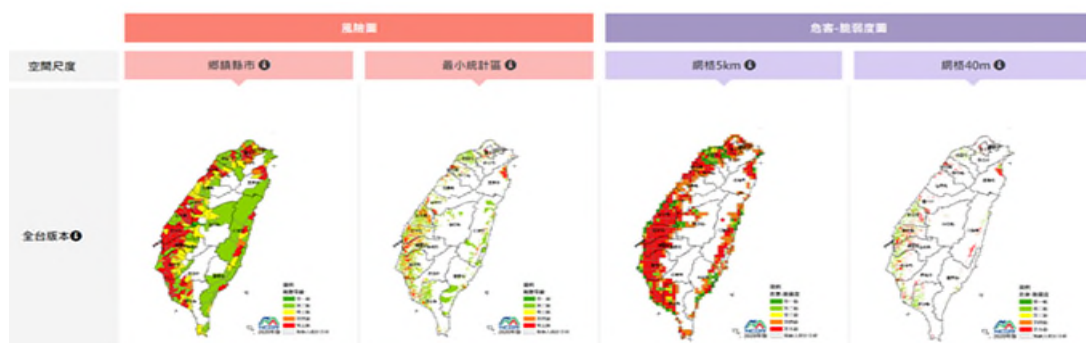
- At the county and city level, the TCCIP platform of the National Science and Technology Council provides climate change data required for several local projects, including gridded observation data, statistical downscaling, and dynamic downscaling climate change estimation data.
- At the community level, several strategies and plans with local characteristics continue to be promoted. For example, The Low-Carbon Community Sustainability Promotion Project EPA was promulgated to encourage local communities to implement ecological greening, green transportation, resource recycling, carbon reduction, and energy-saving work. The project has issued a total of 1,169 low-carbon sustainable home certifications. The project has also implemented the multi-functional smart water garden, using Softscape to create a water-retaining and cooling community, and has completed six demonstration cases of a smart water garden.

2. Eight areas of climate change adaptation

The implementation of Taiwan's climate change adaptation work has been divided into eight areas. The key performances in each adaptation area are shown in Tables 2 to 9.

Disaster-Key performances

- National Science & Technology Center for Disaster Reduction (NCDR) has completed the construction of four spatial scales flooding risk maps of township areas, minimum population areas, 5 kilometers grid, and 40 meters grid (<https://dra.ncdr.nat.gov.tw>). In addition, NCDR has published risk map calculation tools and manuals to strengthen the communication of the map production process and improve the convenience of map data use.
- To improve research on cultural assets preservation and risk assessment, the Bureau of Cultural Heritage of the Ministry of Culture (MOC) has completed the construction of 122 sets of monitoring equipment for the preservation of national cultural assets. Monitoring covers 85 national cultural assets. In addition, 19 sets of ultrasonic wind direction anemometers and 46 image systems were installed to monitor images of 31 national cultural assets as the basis for climate risk assessment of cultural assets.



Analysis for the Construction of Environmental Meteorological Monitoring for Cultural Assets Preservation

- The Water Resources Agency, MOEA, has implemented projects such as the Construction of Reservoir Drought Early Warning Systems, Strengthening the Effectiveness of Flood Warning Platform, Verification of Smart Flood Control Monitoring Plan, Assessment of

the Impact of Water Supply Shortage in Extreme Climate, Advanced Meteorological and Disaster Reporting Platform, using the best available technologies such as artificial intelligence to complete climate change risk assessment, monitoring, and relative work.

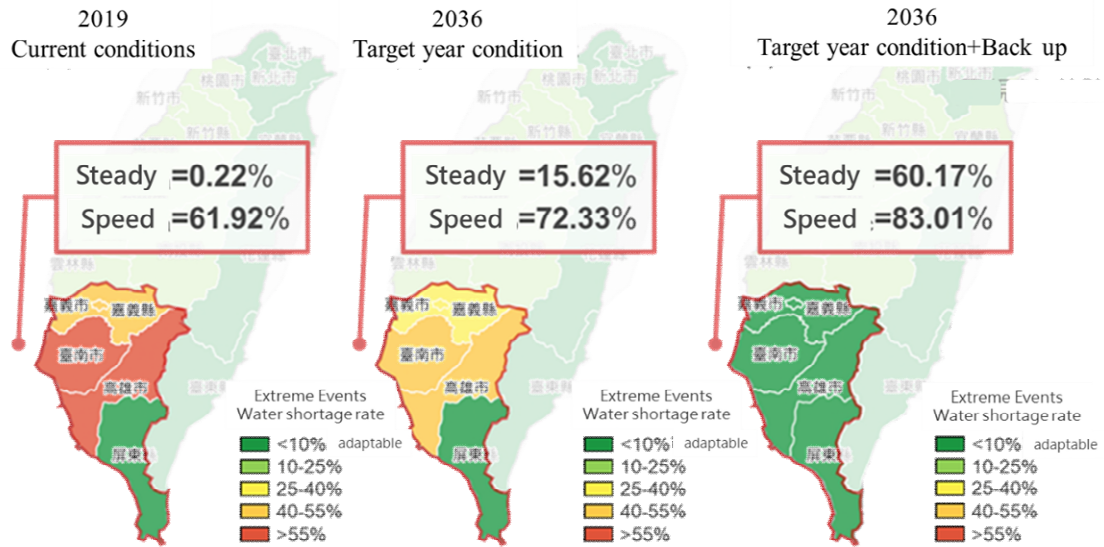


Image source: NSCT

Critical infrastructures-Key Performance

- To improve the transportation system's disaster resilience and enhance road users' safety, the MOTC has continued to review and develop disaster prevention projects and has also used smart technology to implement more than 87 tasks.



Image source: MOTC

- To ensure clear and fluid communication after a disaster, the MOTC has completed the installation of a total of 114 fixed-point disaster prevention communication platforms with backup power that can last up to 72 hours, and 68 of these platforms have level 15 wind resistance.



Image source: MOTC

- To strengthen public works of flood prevention and preparation, the MOTC deployed 52 construction inspection teams to conduct on-site inspections for a total of 4,029 projects nationwide.



Image source: MOTC

Water Resources- Key Performances

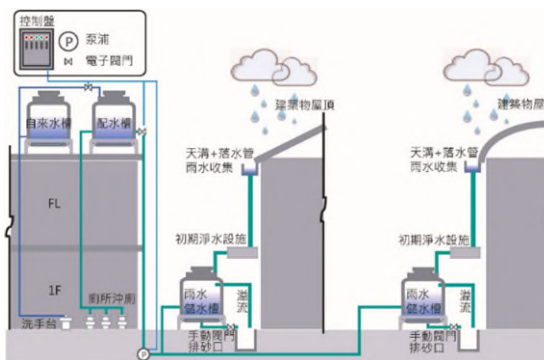
- Since 2017, water resources infrastructure projects have been implemented to expand, save, allocate and store water resources to increase climate adaptation capacity and stabilize water supply. So far, the daily water supply has increased to 1.75 million tons, equivalent to 16% of the country's water consumption.
- To strengthen drought resistance, nearly 80 emergency backup wells in Taoyuan, Hsinchu, Taichung, and Pingtung have been constructed. In addition, the development of several groundwater and reclaimed water projects can provide extra 1.66 million tons of water for emergency use.



Major water conservancy construction projects completed and/or in progress by the Water Resources Agency since 2017

Image source: WRA

- Between 2017-2020, the promotion of Rainwater Storage and Utilization System has led to the construction of 267 systems, including 208 in schools and 59 in institutions. The estimated annual yields of rainwater collection will exceed 356,000 tons per year. Between 2021 and 2022, 22 more systems will be completed. The annual yield of rainwater collection is expected to exceed 31,000 tons per year.



Example of Rainwater Storage and Utilization System Process

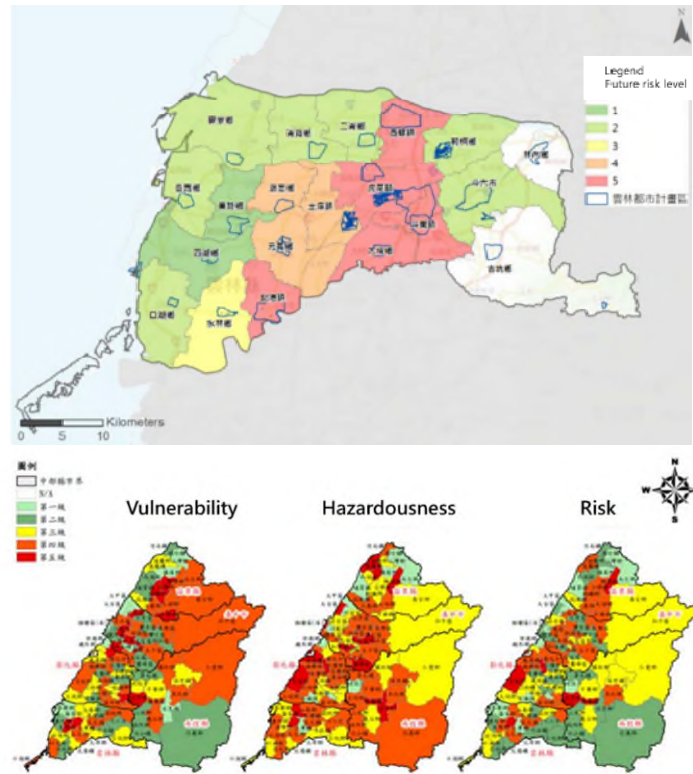


Example of Miaoli Hegang Junior High School Rainwater Storage and Utilization System

Image source: WRA

Land use- Key Performances

- In 2021, subject to the working schedule of the Spatial Planning Act, all municipalities and counties (cities) are required to announce the implementation of spatial plans and proposed adaptation plans for local climate change impact and at-risk areas.



Municipal and county (city)’ s spatial plans;
including risk assessment and climate change adaptation plans
Image source: MOI

- To maintain the natural flood retention function of wetlands, the level of importance of wetlands in Taiwan is being reassessed, and Linluo, Dongyuan, Shihlinger Mountain, and Neiliao wetlands have been proclaimed as important local wetlands.



Assessing important wetlands at local-level Dongyuan wetland

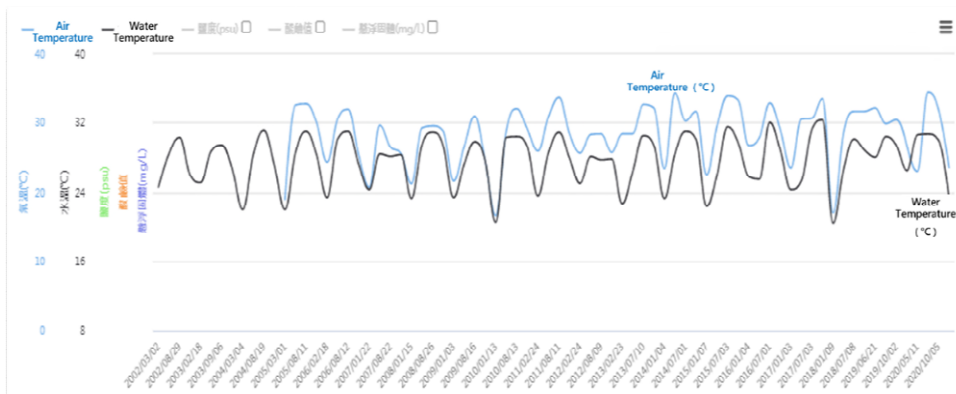


Assessing important wetlands at local-level Neiliao wetland

Image source: MOI

Oceans and coasts- Key Performances

- Continuous monitoring on sea water quality and environmental data at over 105 locations nationwide. A database has been created to support the study concerning the impact of climate change on the marine environment, and to improve emergency response capacities and early warning capabilities of relevant authorities.



Marine Environment Monitoring

Image source: MOI

- Continuously monitoring and investigating the distribution and population changes of critical algal reef ecosystems, cetaceans, seabirds, and other marine life species, so as to understand the ecology and biodiversity of our coastal and offshore area.



Survey of marine biodiversity Image source: MOI

- Review and approval of the first grade coastal conservation plans established by the Ministry of Economic Affairs. Also, the secondary grade conservation plans established by municipal and/or

county' s (city) governments shall be approved by the Ministry of Economic Affairs so as to ensure the safety of coastal tribes, the compliance with land use guidelines, and reduce disaster risks, as well.



The length of the coast of the main island of Taiwan is 1151 Km

The length of the first grade coastal conservation plan area is 331.4 Km
 The length of the secondary grade coastal conservation plan area is 249.3 Km } About 50.44% of the coastline


The location of first and secondary grade coastal protection plans on Taiwan's main island Image source: MOI






Energy supply and industry- Key Performances

- Extreme climate risk assessment criteria applicable to the energy sector for flooding, strong winds, high temperature, and slope disasters have been successively developed and provided to the energy sector, along with climate change risk assessment guidelines, maps, and platforms to guide energy companies to assess the impact of climate change and relevant risks on energy facilities. In addition, climate change adaptation management procedures have been promulgated for the manufacturing industry to help manufacturers assess transition risks and costs and enhance their ability to adapt to climate change.

CLIMATE CHANGE ADAPTATION PLATFORM
for ENERGY

EICCA



Promote adaptation work	Adaptation Promote talent cultivation
<ul style="list-style-type: none"> - Risk assessment criteria and climate change data for flood damage, strong wind, high temperature, and slope disaster. - Clear step-by-step instructions 	<ul style="list-style-type: none"> - Analyze and share international energy adaptation issues and cases - Cultivate talents regularly in the energy field
<p>→ 步驟.1 界定評估範疇</p> <p>→ 步驟.2 評估現況與未來風險</p> <p>→ 步驟.3 界定與評估調適措施</p> <p>→ 步驟.4 規劃與執行調適措施</p> <p>→ 步驟.5 監測與評價</p> 	<p style="text-align: center;">  Adapt  Climate Change  Energy </p> 

Climate Change Adaptation Platform for Energy Sector (EICCA)

Image source: MOEA

Agricultural production and biological diversity- Key Performances

- In 2021, the Central Weather Bureau, MOTC, assisted in refining the forecast data for 130 major economic crop production zones and completed the establishment of 59 sets of agricultural weather stations. More than 600 weather stations can provide information for agricultural applications to develop climate change adaptation strategies. In addition, the system integrates with the disaster database of the crop disaster early warning platform through mobile application and LINE to strengthen farmers' disaster prevention capabilities.



Weather & Agricultural Disaster Prevention
mobile application Image source: COA

- Users can browse typhoon, high temperature, rainstorm, and strong wind event warnings on the Weather & Agriculture Disaster Prevention mobile application, or search for Agricultural Research and Extension Stations, Agricultural Weather Stations, and view crop areas in specific counties and cities to get detailed weather monitoring information for each location.

Health -Key Performances

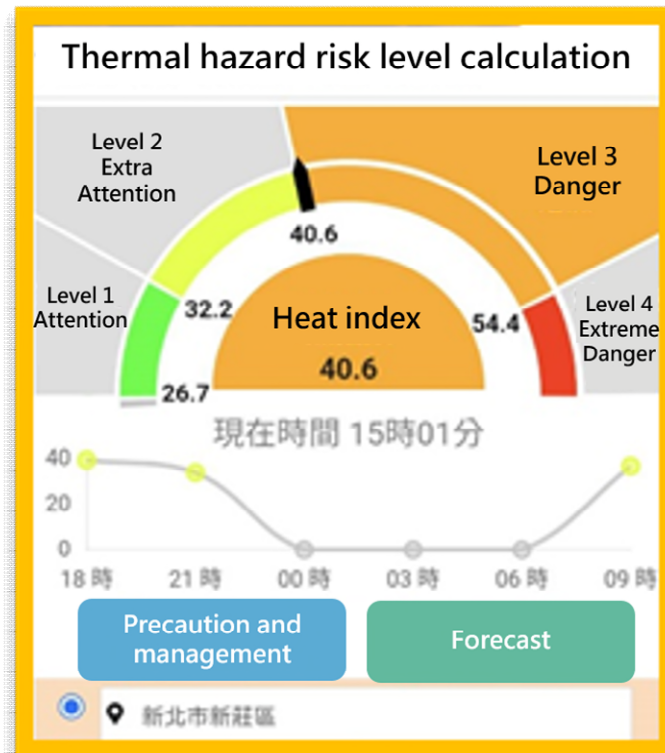
- Government agencies have collaborated to build a national health weather warning platform and mobile application, LOHAS Weather-Health Service, to proactively notify the public of heat (cold) injuries, the early warning classification, and protective measures. The Health Promotion Administration also uses various channels to carry out heat injury prevention publicity in summer and remind the public to keep warm during cold spells in winter to prevent cardiovascular and respiratory diseases deterioration by low temperatures.



Weather & Agricultural Disaster Prevention mobile application

Image source: MOHW

- The Occupational Safety and Health Administration of the Ministry of Labor (MOL) has created the High-Temperature Outdoor Work Heat Injury Prevention Action Information Website, which allows users to check the heat injury risk level of a designated location online, explore which precautions should be taken, and access information on nearby medical institutions. In addition, publicity and supervision inspections are carried out as the surveillance measures to strengthen the protection against heat injuries of workers working outdoors at high temperatures.



High Temperature Outdoor Work Heat Injury Prevention Action
Information Web Page Image source: MOHW

- During hot and cold spells and during the Spring Festival, the government works with private resources and nonprofit groups to provide services to homeless people; including food and goods distribution and visits and continues to strengthen the care for disadvantaged groups.



On the street where the cold snap hits,
social workers provide cold protection materials

Image source: MOHW

- During the annual Disaster Preparedness and National Defense Mobilization Exercise, disaster emergency response drills are carried out for the national-level disaster medical rescue teams to strengthen emergency medical response capability in the advent of heavy casualties and diseases related to climate change.



Taitung County Government's 2022 Annual Disaster Prevention and Rescue Exercise

Image source: MOHW



2021 National Disaster Medical Ambulance Team (NDMAT) Disaster Emergency Medical Response Drill

Image source: MOHW

- Inspection of the situation of infectious diseases related to climate change and the review of prevention and control actions are done to continue to strengthen the warning and monitoring mechanisms, improve epidemic investigation and various epidemic prevention measures, such as active inspection and removal of breeding sources in the community to reduce the density of mosquitoes vectors of disease.



People take the initiative to inspect and eliminate the breeding source of vector mosquitoes in the community

Image source: MOHW