

2022

Adaptation Communication

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The Government of Republic of China (Taiwan)



行政院
Executive Yuan

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I. Background

The 26th United Nations Climate Change Conference (COP26) Resolution 9/CMA.1 invites parties that have not yet submitted an Adaptation Communication (ADCOM) to do so by COP27 (November 6-18, 2022), in order to provide timely information for the Global Stocktake and facilitate the setting of Global Goal on Adaptation (GGA). Although the Republic of China (Taiwan) is not a party, in response to the call of the UNFCCC resolution, we have prepared the Adaptation Communication before the due date as follows, for the reference of our domestic and international counterparts.

II. National Conditions

The Republic of China (Taiwan), hereafter Taiwan, has jurisdiction over the main island of Taiwan and its affiliated islands, the Penghu Islands, the Kinmen Islands, the Matsu Islands, the Dongsha Islands, and the Nansha Islands, with a total area of 36,179 square kilometers. The main island of Taiwan is located on the southeastern edge of the Asian continental shelf, between the 21st and 26th north parallels, with the Tropic of Cancer (23.5 degrees North Latitude) passing through Chiayi County. Taiwan has a north-south length of 394 kilometers and a maximum width of 144 kilometers from east to west. Surrounded by the Pacific Ocean to the east, the Taiwan Strait to the west, and the Bashi Channel to the south, Taiwan has a total coastline

of 1,139 kilometers. The topography is high in the east and low in the west, with mountains, hills, basins, terraces, and plains as the main features.

Taiwan has a subtropical and tropical oceanic climate and is located in the Asian monsoon region. In winter, it is affected by the northeast monsoon due to the continental cold high, and in summer, it is affected by the southwest monsoon due to the monsoon low. Taiwan's temperature shows a continuous upward trend of a magnitude that is more obvious than the overall rise in global temperature. 2020 was the warmest in Taiwan's meteorological records, with an annual average temperature of 24.6°C, about 1°C higher than the climatic average. The main sources of rainfall include spring rains, East Asian monsoon rains, typhoons, southwesterly flow rains, and northeast monsoons. The average total annual rainfall in 2020 was 1,742.4 mm, 464.7 mm lower than the climatic average and only 78% of the climatic average of 2,207.0 mm. 2020 was the seventh least rainy year in the country's meteorological records. Especially in the central mountain area, rainfall was only about 50-70% of the climatic average.

III. Impact, Adaption and Risks

In response to the latest scientific data of the Sixth Assessment Report (AR6) released by the Intergovernmental Panel on Climate Change (IPCC), the National Science and Technology Council (NSTC) and other government agencies jointly released a report presenting the historical climate change

data and the latest future projections for Taiwan, and presented the results of research carried out by scientific teams on the impact of climate change to help the public understand how climate change will affect the country.

According to local observation and analysis, the annual average temperature in Taiwan increased by about 1.6°C from 1911 to 2020.. This temperature increase has accelerated in the past 50 years and the past 30 years (Figure 1).

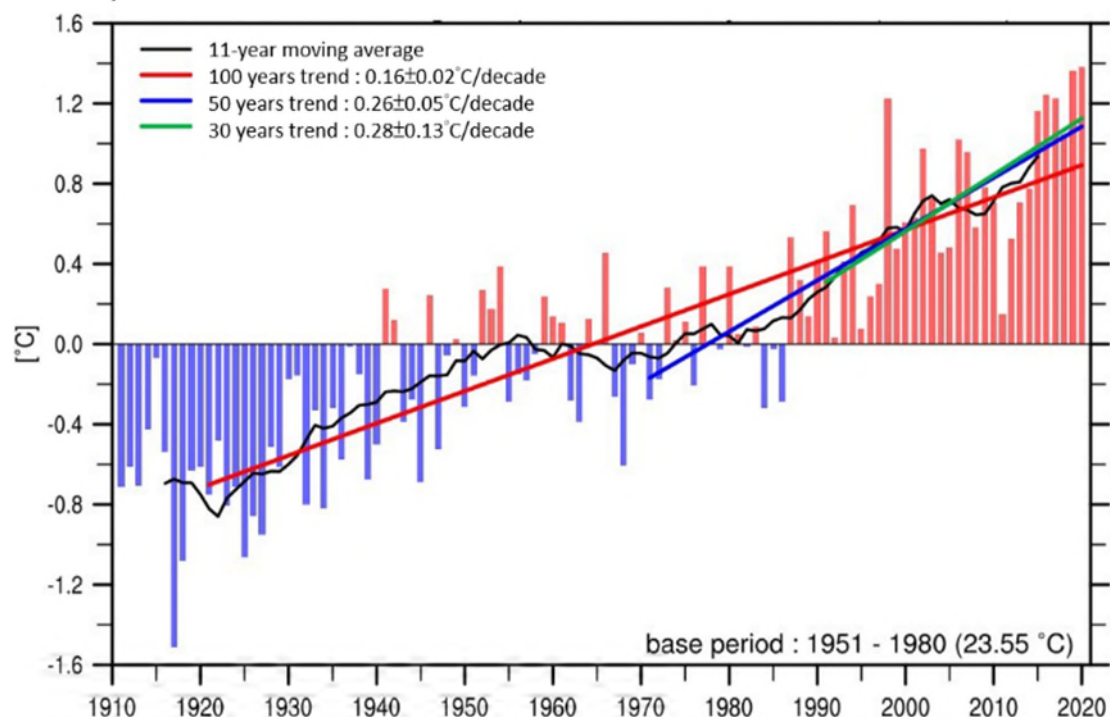
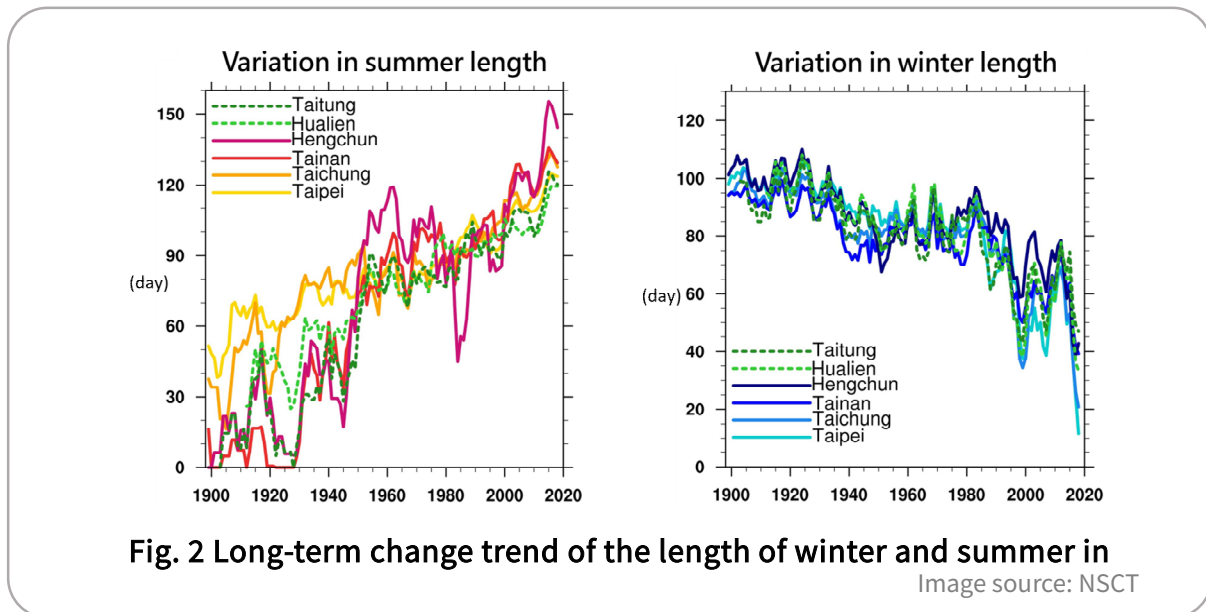


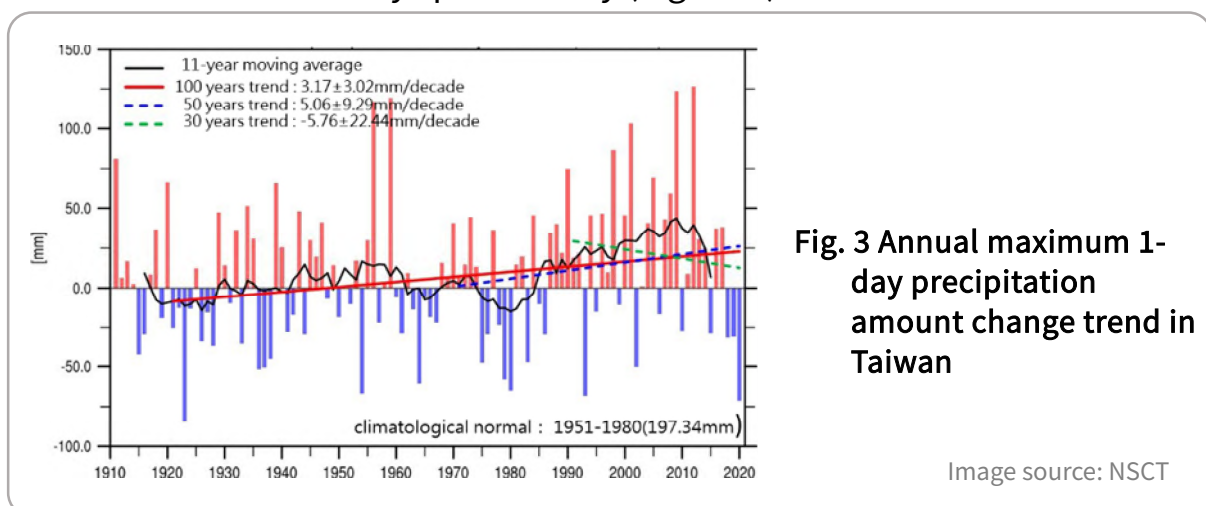
Fig. 1 Annual average temperature trend in Taiwan

Image source : NSCT

In terms of the distribution of seasons, the length of summer has increased to about 120-150 days in the early 21st century, while the length of winter has shortened to about 70 days and to about 20-40 days in recent years (Figure 2).



In terms of rainfall, the trend of total annual precipitation did not change significantly. Still, the annual max 1-day precipitation amount shows a significant increasing trend from 1991 and 2020 (Figure 3), and the trend of maximum yearly consecutive dry days changed markedly, with an increase of about 5.3 days per century (Figure 4).



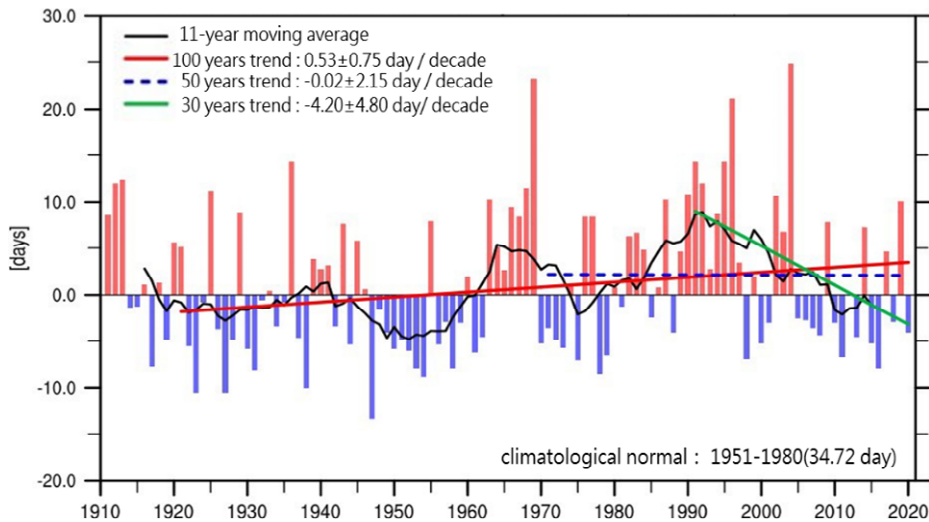


Fig. 4 Annual maximum consecutive dry days trend in Taiwan change trend in Taiwan

Image source: NSCT

It is estimated that the worst global warming scenario with high greenhouse gas emissions (SSP5-8.5) will have a more significant impact on the country than the ideal mitigation scenario (SSP1-2.6). In terms of temperature, under the worst-case scenario, the number of days with daily maximum temperatures above 36°C will increase by about 48 days by the end of this century; under the ideal mitigation scenario, the number of days will only increase by 6.6 days (Figure 5).

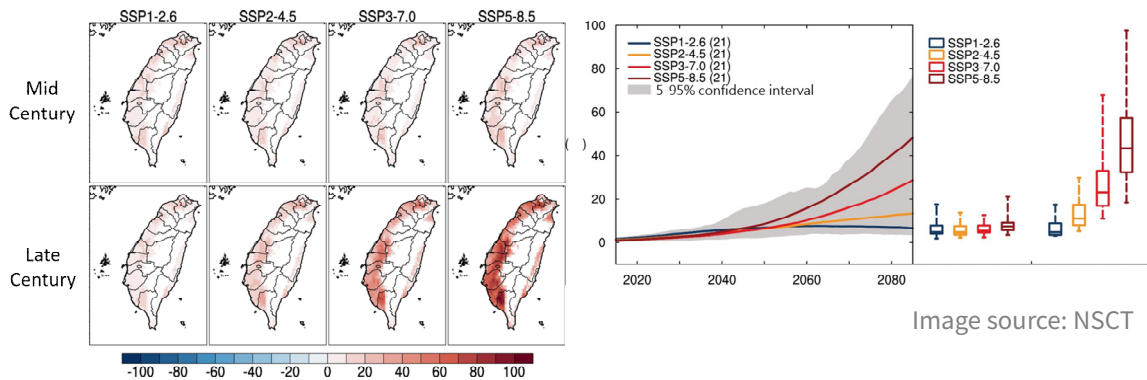
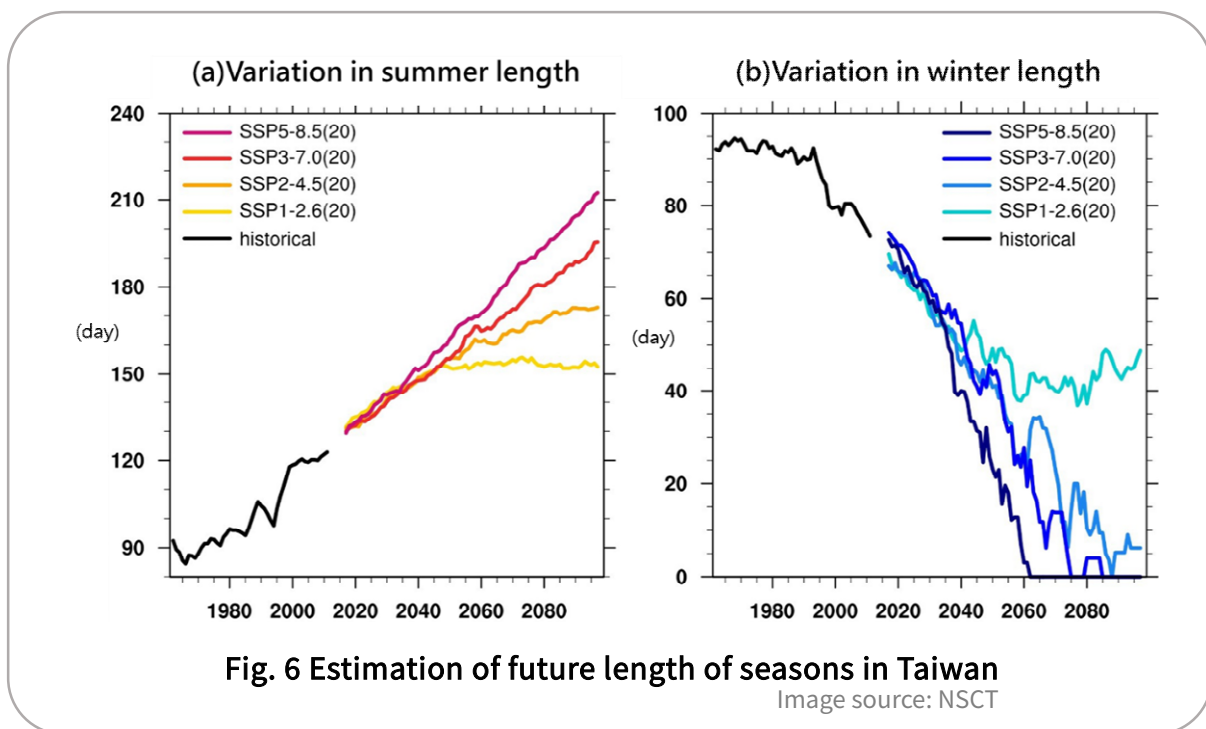


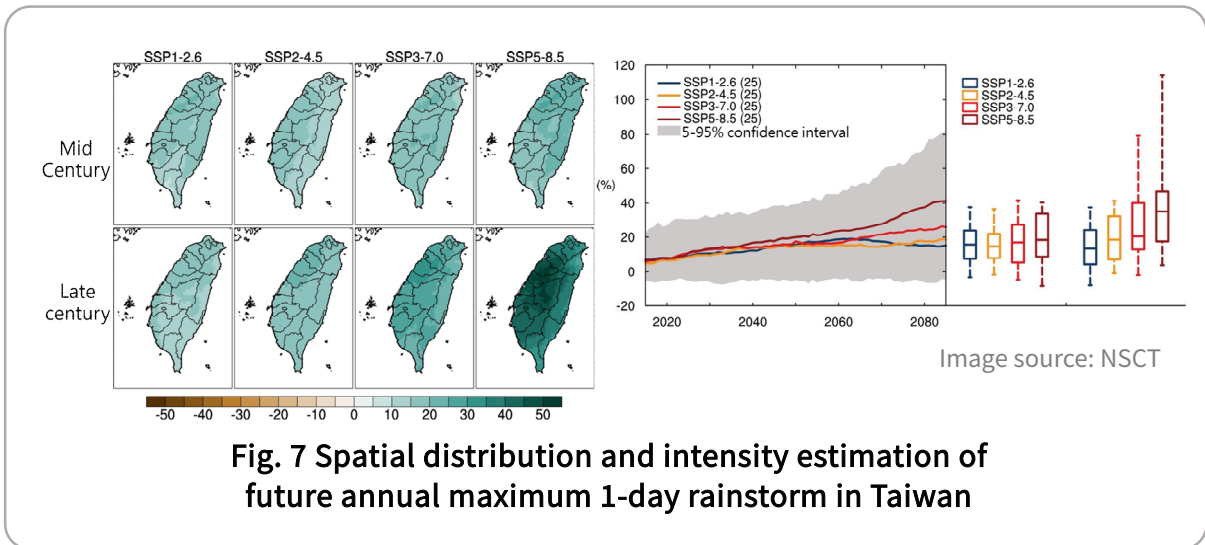
Fig. 5 Estimation of future spatial distribution and number of days

Image source: NSCT

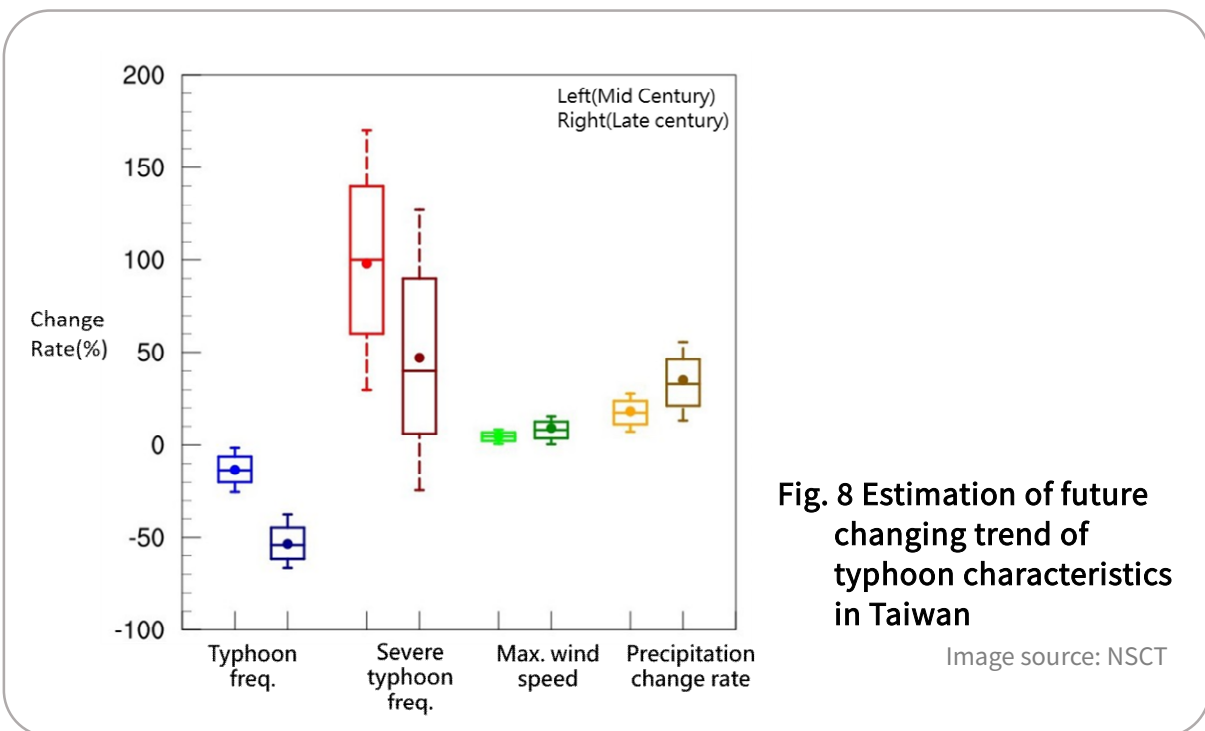
Considering the seasonal length change, the length of summer will increase from about 130 days to 155-210 days, while winter will decrease from about 70 days to 0-50 days. The changing trend was significant in the worst-case scenario and relatively moderate in the ideal mitigation scenario (Figure 6).



The annual maximum 1-day precipitation associated with disaster impact will increase by about 41.3% at the end of the 21st century under the worst-case scenario and by about 15.3% under the ideal mitigation scenario (Figure 7).

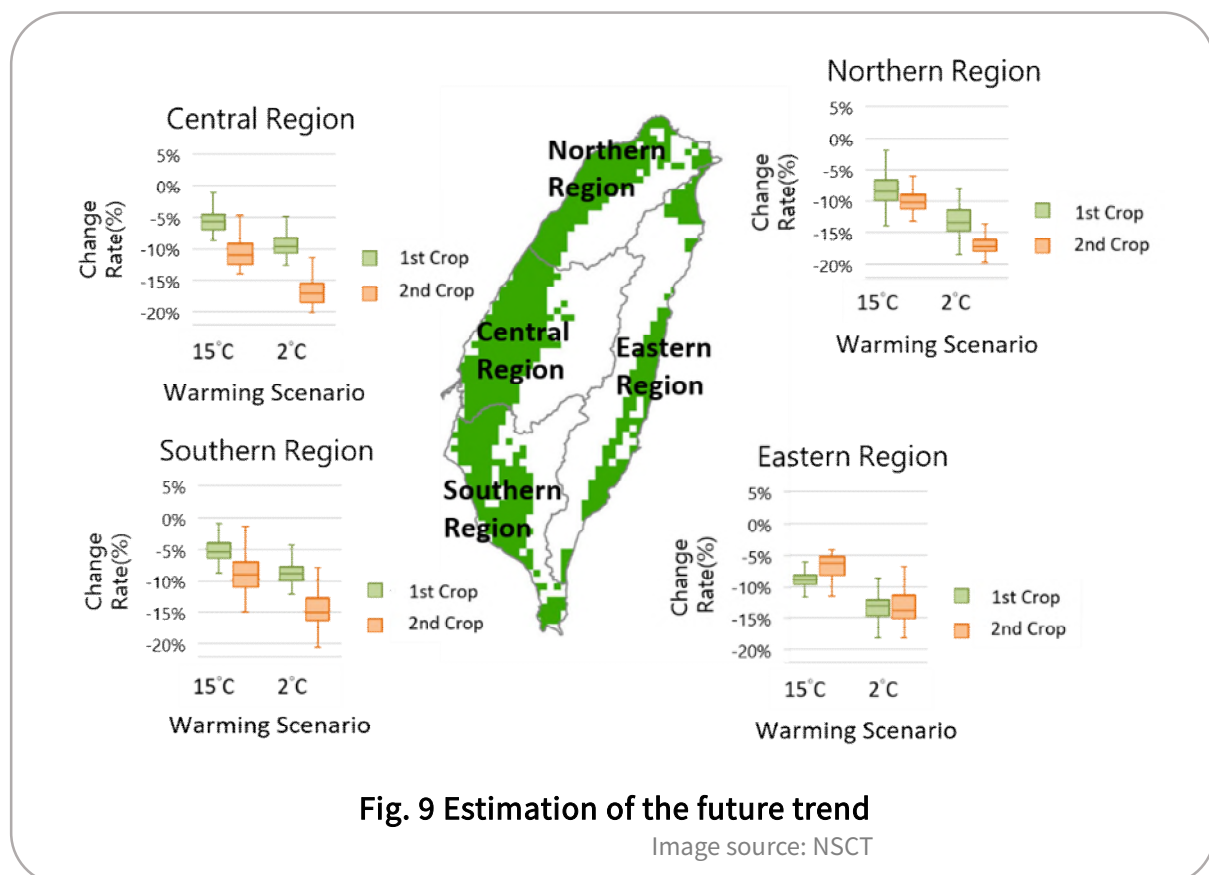


Under the worst-case climate scenario (RCP8.5), the number of typhoons affecting Taiwan will decrease by 15% and 55% by the middle and end of the century, respectively. Still, the severe typhoons will increase by 100% and 50%, while the typhoon rainfall change rate will increase by 20% and 35%, respectively (Figure 8).



The various impact factors from climate change will affect sectors in Taiwan differently. Amongst all the factors, the ones with potentially significant impact on the country can be summarized as follows: temperature (hot and cold), rainfall (wet and dry), coast and ocean (sea level rise, marine heatwaves, ocean acidification, etc.). The following summarizes the potential impact on various sectors based on temperature, rainfall, and sea level rise changes.

Under the future warming scenario, rice production in Taiwan shows a decreasing trend in agriculture, and the average yield reduction of the second crop is more obvious than that of the first crop (Figure 9).



Under the future warming scenario, there will be an increase in extreme rainfall intensity, a decrease in the chance of typhoons hitting Taiwan, and a change in rainfall patterns. In terms of flooding impact, all regions showed an increasing trend except for the central region, which showed a slight decrease in the middle of the century. In terms of the impact of slope failure disaster, all regions showed an increasing trend in the middle of the century, except for the central mountainous areas. This increasing trend becomes more evident at the end of the century. In terms of water resources, the fluctuation of river flow between wet and dry seasons in catchment areas became more extensive, and the flow in spring generally showed a decreasing trend in the middle of the century. This change was more significant at the end of the century, which may increase the risk of drought (Figure 10).

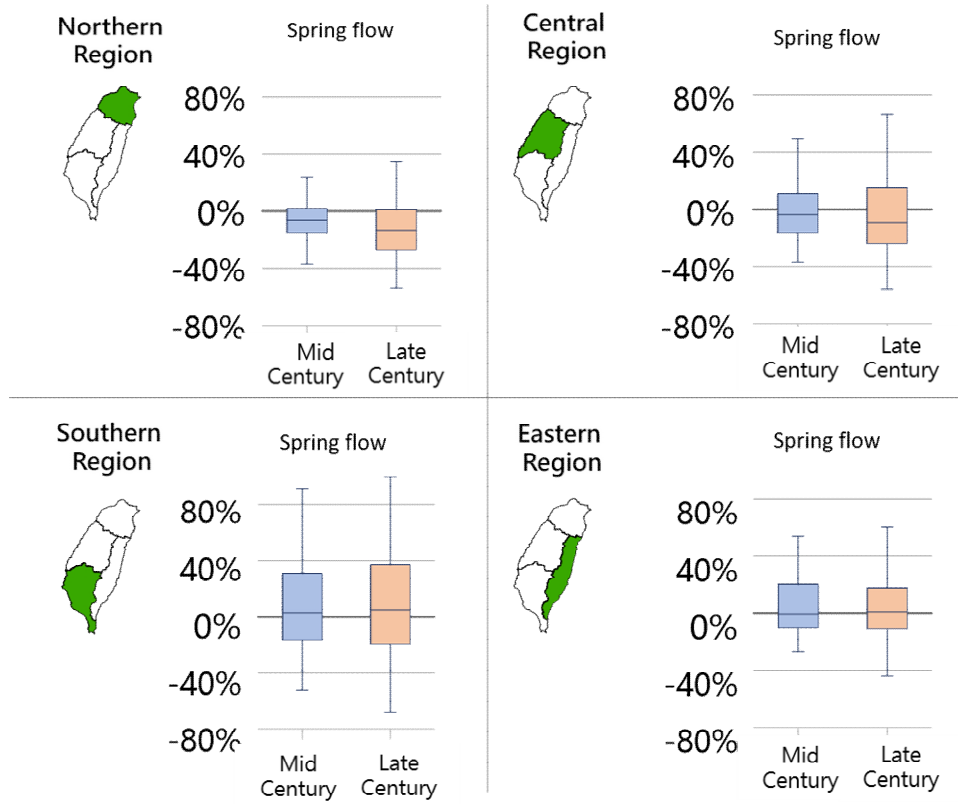


Fig. 10 Estimation of the maximum number of consecutive days without rainfall and the future trend of spring flow in the water resources division Image source: NSCT

Under the worst-case climate scenario (RCP8.5), the wind speed of typhoons will increase by about 2% to 12% at the end of the century, with an average increase of 8%. Due to its natural geography, the impact of typhoons and waves along the coast of Taiwan is more significant on the northeast and southeast coasts. In comparison, the impact of storm surges is greater on the north, northeast, and central coasts. Therefore the impact on these areas will be higher than other areas under the warming scenario. According to the IPCC AR6, in a 2°C warming scenario, the sea level around Taiwan will rise by about 0.5 meters, and in a 4°C warming scenario, the sea level will rise by 1.2 meters. Taking the Taipei metropolitan area as an example, sea level rise may lead to flooding in areas mainly located in the estuary of the Danshui River. Under the protection of existing dikes, the impact on urban areas will be relatively small. In southwestern coastal areas such as the Tainan area, sea level rise may cause an overflow in lowlands, especially in coastal fish farms, wetlands, and sandbars (Figure 11).

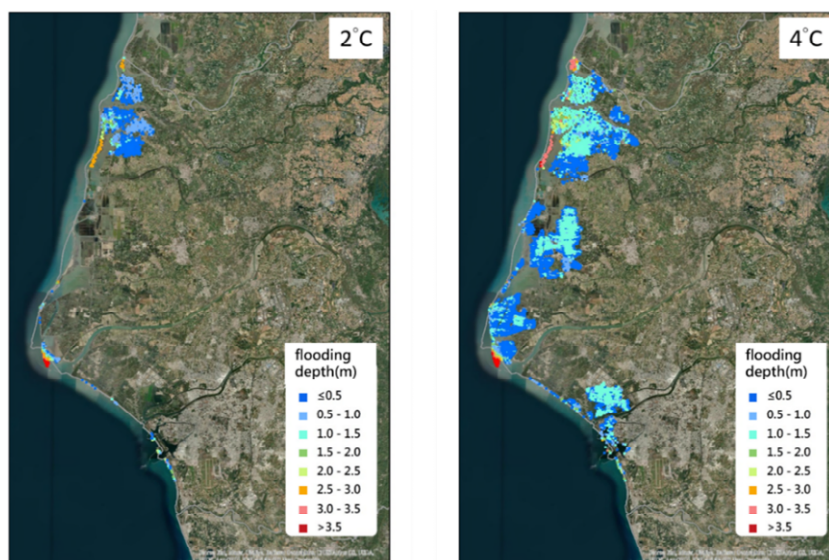


Fig. 11 Estimation of future sea-level rise change trend in Tainan area

Image source: NSCT

IV. Institutional and Legal Framework to Implement Climate Change Adaptation

The Council for Economic Planning and Development of the Executive Yuan (now the National Development Council) initiated the development of Taiwan's climate change adaptation policy. In 2010 the Academia Sinica was commissioned to establish a cross-disciplinary team and invited relevant ministries, experts and scholars, NGOs, and industry representatives to set up the task force for Planning and Promoting Climate Change Adaptation Policy Guidelines and Action Plans. Review meetings, regional symposiums, and national climate change conferences were held successively to solicit opinions from all sectors and to build consensus. On June 25, 2012, the Executive Yuan approved the framework for Adaptation Strategy to Climate Change in Taiwan. Taking into consideration the practices of countries around the world, as well as the unique characteristics of the country's environment and historical experience, eight sub-groups in the adaptation field were established under the aforementioned task force to formulate relevant strategies, implement promotion mechanisms and supporting measures. In May 2014, the National Climate Change Adaptation Plan (2013-2017 NAP) was finalized in conjunction with various ministries.

Afterward, the Environmental Protection Administration (EPA) completed the legislation of the Greenhouse Gas Reduction and Management Act in 2015 and formulated the National Climate Change Action Guideline in 2017. In 2018, the EPA convened 16 ministries, including the National Development Council, to jointly draft the National Climate Change Adaptation Action Plan (2018-2022 NAP), which serves as the institutional framework for implementing the climate change adaptation works. The distribution of work among ministries is shown in Figure 12.

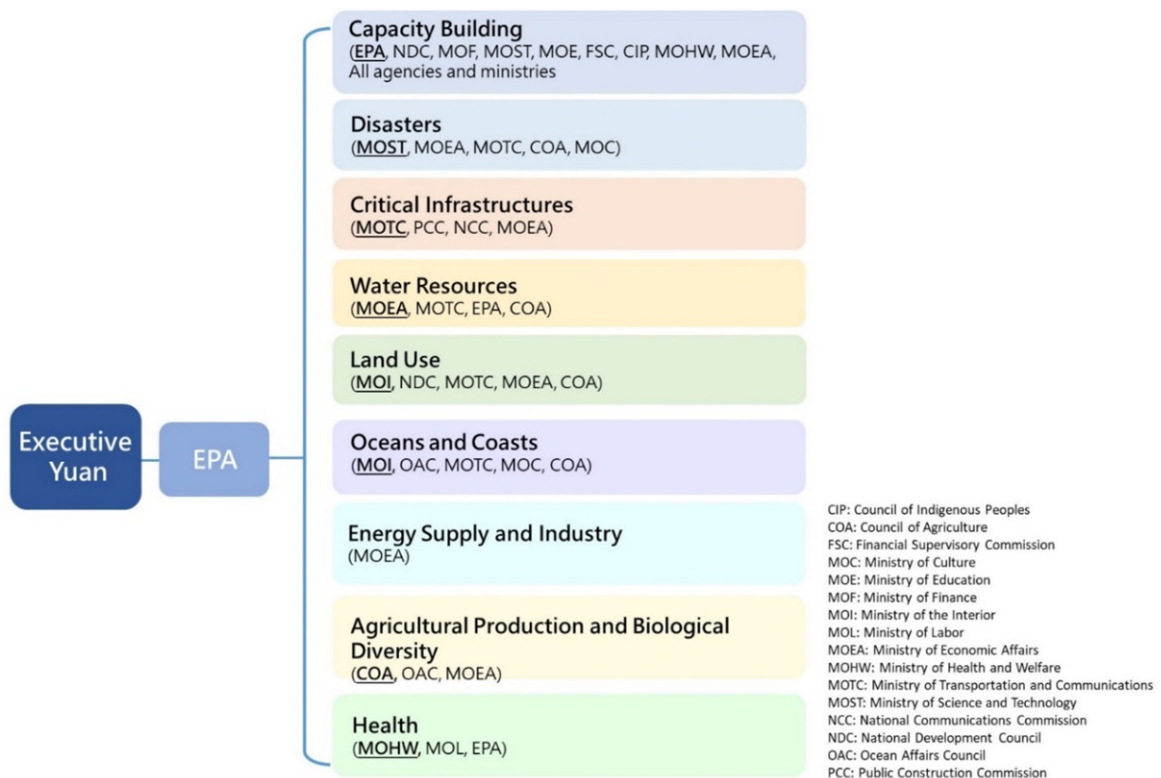


Fig. 12 Institutional work distribution among ministries

The legal framework to justify the implementation of climate change adaptation is mainly composed of *the Greenhouse Gas Reduction and Management Act, Spatial Planning Act, Coastal Zone Management Act, Water Act, Wetland Conservation Act, Agriculture Insurance Act and National Park Law*, which are highlighted in Figure 13.

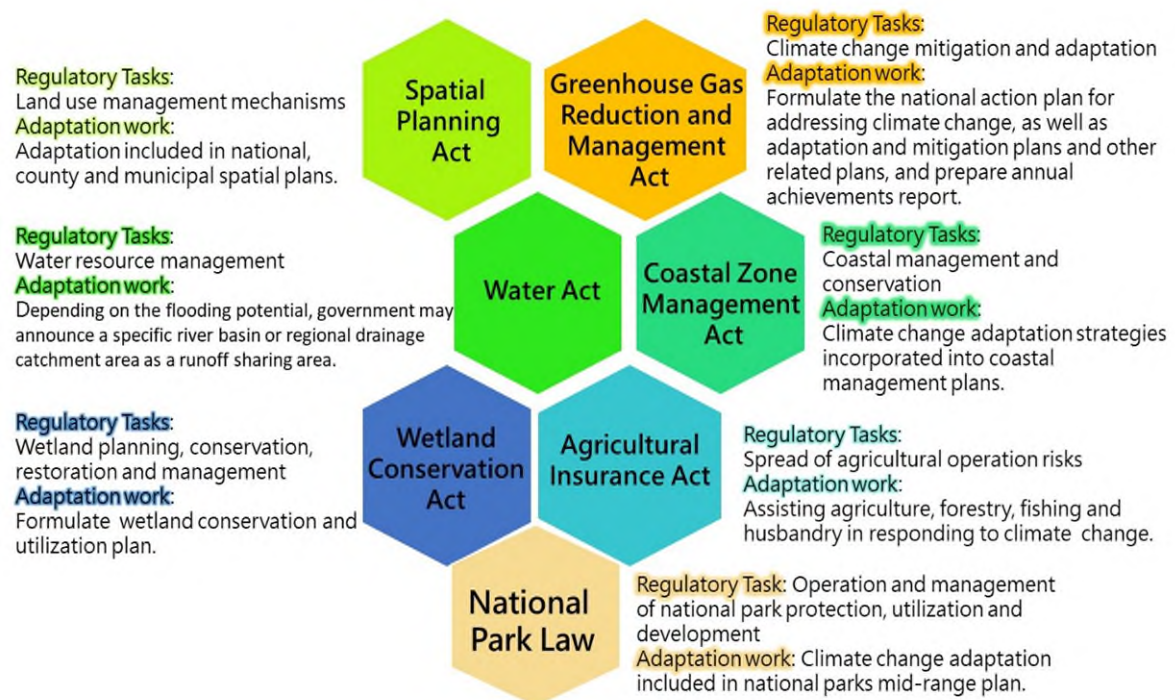


Fig. 13 main regulations for driving climate change adaptation

1. Greenhouse Gas Reduction and Management Act

In 2015, *the Greenhouse Gas Reduction and Management Act* of Taiwan entered into force, making the country one of the few countries in the world to write the long-term carbon emission reduction goal into law. As the global warming increases, the EPA proposed a draft bill in October 2021, renaming the bill as the Climate Change Response Act,

as part of the effort to expedite carbon emission reduction and strengthen climate change adaptation. The draft was submitted to the Legislative Yuan for deliberation on April 21, 2022. The highlight of the draft bill is to write the 2050 Net-Zero emission goal into law, upgrade the level of climate governance, add a special chapter on climate change adaptation, strengthen emission controls and incentive mechanisms to promote reduction, and charge carbon fees which would be earmarked for carbon emission reduction purposes. The primary coverage of the climate change adaptation is illustrated in Figure 14.

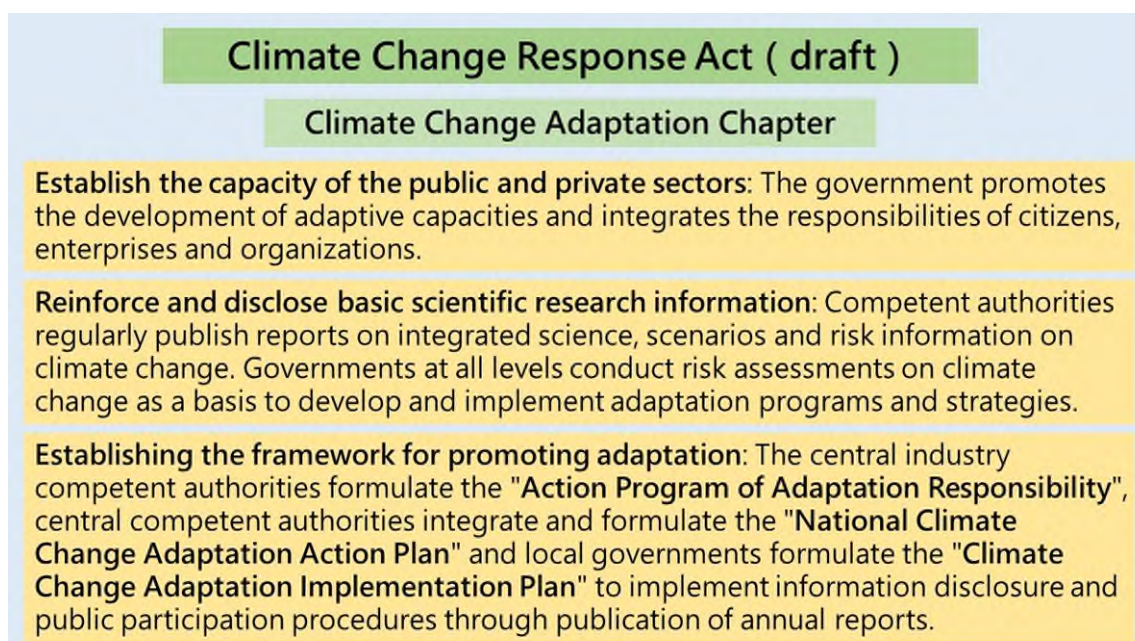


Fig. 14 Summary of Climate Change Adaptation Chapter of "Climate Change Response Act" (draft)

2. Spatial Planning Act

The substantive contents of the Spatial Planning Act include establishing a national spatial plan, confirming the priorities of the spatial plan, delineating the functional zones of the land, establishing a licensing system, establishing an information disclosure mechanism, including citizen participation in supervision, promoting environmental restoration and sustainable development, protecting civil rights, as well as developing a compensation and relief mechanism. The Spatial Planning Act came into force on May 1, 2016, stating that the contents shall include climate change adaptation strategies and "the content of the national spatial plan for special municipality and counties shall include climate change adaptation plans."

3. Coastal Zone Management Act

Taiwan is surrounded by sea, with a coastline of 1,566 kilometers and a large coastal land area. To implement integrated coastal management and promote the sustainable development of coastal areas, the government promulgated the Coastal Zone Management Act in February 2015, stating that "disaster prone coastal zones shall adopt indented buildings or adjust its land use in response to climate change and the risk of coastal disaster." It also states that "the Central Competent Authority shall formulate an integrated coastal zone

management plan for the conservation, protection, utilization, and management of land in coastal zones."

4. Water Act

The *Water Act* is the legal basis for water resources administration and construction of waterworks in Taiwan. It's aimed to ensure the supply and demand of water resources. Climate change, a higher frequency of extreme rainfalls, high urbanization, and large-scale land development in the middle and upper reaches of rivers all contribute to the increased risk of flooding. Therefore, a new chapter on Runoff Allocation and Outflow Control was added to the law in May 2018, requiring land and building developers to jointly share the responsibilities for flood retention and water storage to improve the overall flood resistance of the land.

5. Wetland Conservation Act

To ensure natural flood retention and other functions of wetlands, maintain biodiversity, and promote ecological conservation and wise use of wetlands, the *Wetland Conservation Act* was enacted in February 2015. Wise use is the core spirit of the law, with conservation and use plans formulated for each wetland according to its different characteristics, while respecting the existing use by citizens to strike a

balance between citizen's rights, local development and environmental protection. Among them, "wise use" refers to the use of wetland resources inclusively within the ecological carrying range of wetlands, maintaining quality and quantity in a stable state, and providing timely, appropriate, and permanent management of biological resources, water resources, and land.

6. Agricultural Insurance Act

According to statistics, the average annual agricultural loss from natural disasters in Taiwan over the past 20 years is approximately NT\$12.3 billion. Given the increasing severity of global warming and climate change, it is necessary to help the sectors of agriculture, forestry, fishery, and husbandry spread agricultural business risks by enacting a special law. *The Agricultural Insurance Act* came into force in Taiwan on January 1, 2021. The critical measures include subsidizing farmers' insurance premiums, establishing a risk-spreading mechanism, providing insurers with preferential taxation and assisting in damage inspection, etc., to ensure farmers' income security.

7. National Park Law

National parks are established to protect the nation's unique natural scenery, wildlife and historical sites, as well as set aside areas

for public recreation and scientific research.” The vast natural vegetation areas of national parks are important sites for carbon sequestration that can help mitigate climate change. In response to global environmental changes, national parks can help promote ecological restoration, environmental education, and eco-tourism experience, reduce the impact of recreational behavior on the environment, enhance people's reflection on global warming and contribute to the implementation of the concept of sustainable development.

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

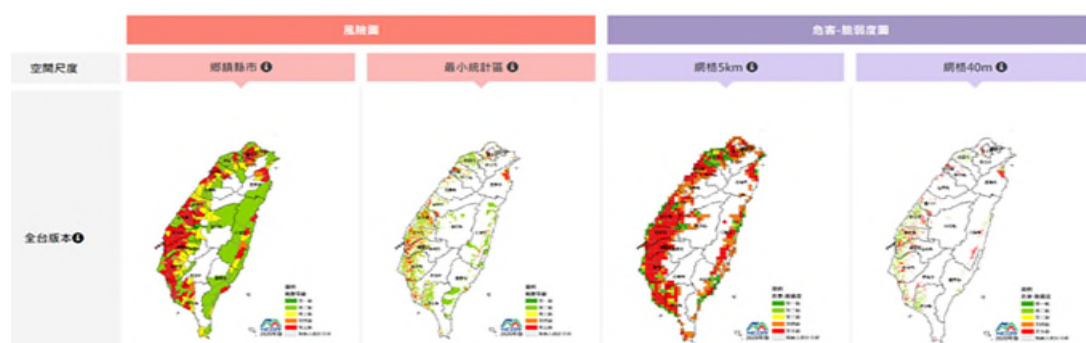
- At the county and city level, the TCCIP platform of the National Science and Technology Council provides climate change data required for several local projects, including gridded observation data, statistical downscaling, and dynamic downscaling climate change estimation data.
- At the community level, 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.

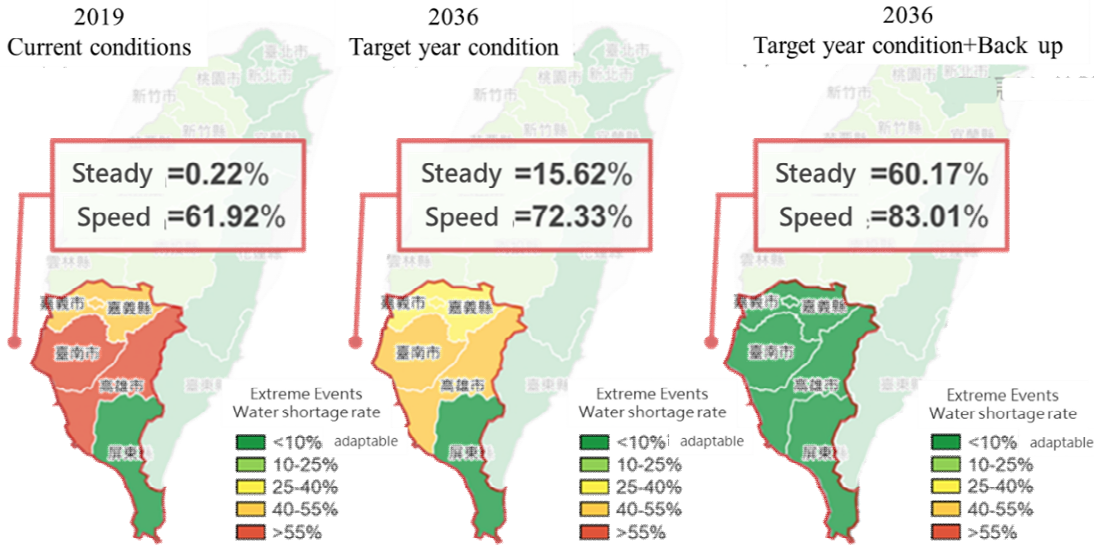


Image source: NSCT

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

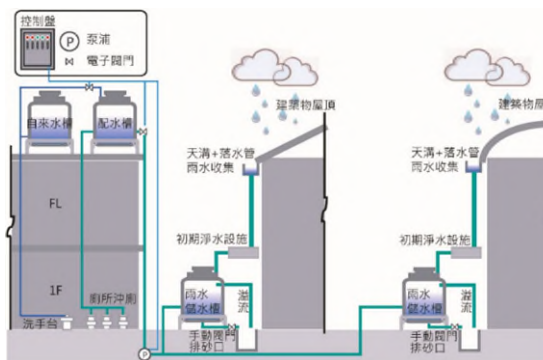
- Since 2017, water resources infrastructure projects have been implemented to expand, save, allocate and store water resources to increase climate adaptation capacity and stabilize water supply. So far, the daily water supply has increased to 1.75 million tons, equivalent to 16% of the country's water 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

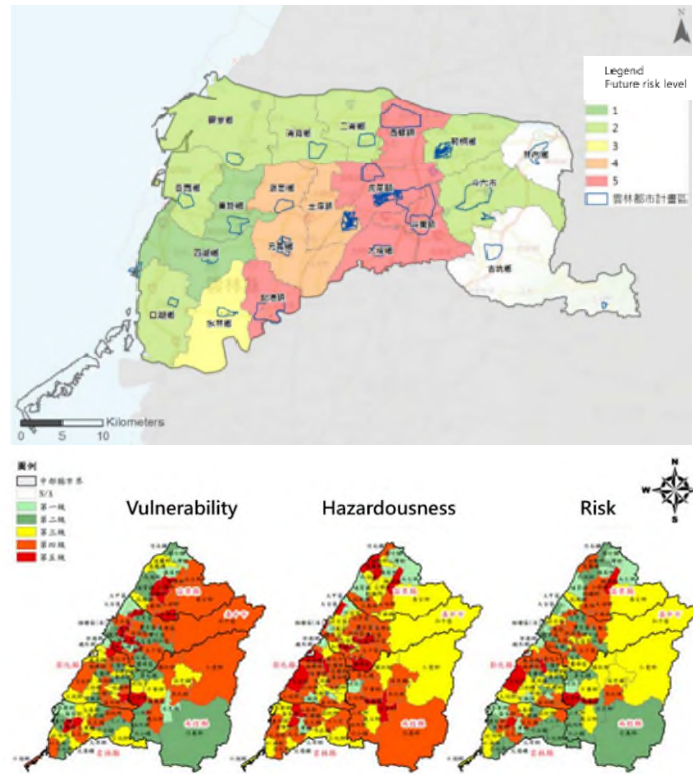


Example of Miaoli Hegang Junior High School Rainwater Storage and Utilization System

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

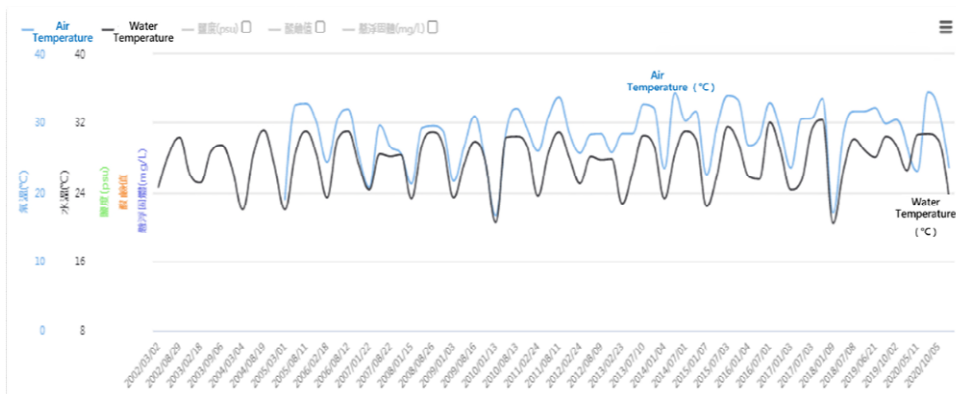


Assessing important wetlands at local-level Neiliao wetland

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

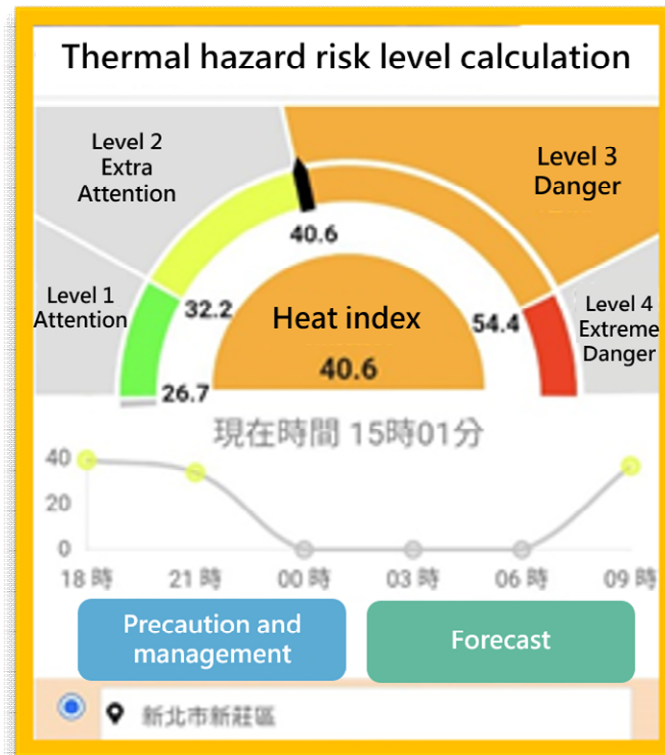
- Government agencies have collaborated to build a national health weather warning platform and mobile application, LOHAS Weather-Health Service, to proactively notify the public of heat (cold) injuries, the early warning classification, and protective measures. The Health Promotion Administration also 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

VI. International cooperation

Climate change is an urgent challenge faced by the international community. As a member of the global village, Taiwan is actively implementing the United Nations Framework Convention on Climate Change (UNFCCC) while continuing to participate in relevant meetings and work as a Non-Government Organization (NGO) observer. Taiwan also cooperates closely with diplomatic allies to share valuable experience in promoting climate change adaptation and environmental protection with the international community, as exemplified in the three cases below.

1. Belize Urban Resilience and Disaster Prevention Project

- Background -



- Belize suffers from the threat of extreme rainfall due to climate change. The low-lying coastal plains, as well as densely populated zones, are the worst-hit areas, resulting in the loss of lives and property. To minimize the impact of extreme weather, the Government of Belize and the town council of San Ignacio/Santa Elena have sought assistance regarding the use of a Geographic Information System (GIS) to enhance Belize's capacity in applying technology to reduce disasters. This project is designed to cope with the types of natural disasters that occur in Belize, as well as the existing software and hardware conditions of the country's disaster prevention units, to assist in marking out potential flood areas and strengthening monitoring, as well as establishing an early warning mechanism for floods. Capacity building and training courses will also be included to enhance the technical capabilities of Belize's disaster prevention and protection units.

- Case & Results -

- This project assists the Belizean government in using GIS technology to establish an early warning system, improve flood preparedness and disaster response efficiency, and carry out infrastructure improvement at the demonstration site. The warning system is expected to be integrated into the country's disaster prevention and rescue system to substantially reduce the loss of life and property caused by floods in Belize. The main goals of this project include:
 1. Strengthening overall flood preparedness and prevention, as well as updating basic maps.
 2. Applying advanced monitoring techniques.
 3. Carrying out flood control in flood-prone areas.
 4. Raising awareness and knowledge of disaster prevention.
- As of the end of March 2022, the following activities have been completed :
 1. Update of the measurement data of river cross section of National Hydrological Service.
 2. Update of cadastral maps, land use maps, road maps, river maps, watershed maps, bridge maps, public facilities maps and inundation potential maps.
 3. Update of the digital terrain model (DTM) with a resolution of 12.5X12.5 meters.
 4. Completion of the potential inundation simulations of San Ignacio and Santa Elena.
 5. Completion of the 12-hour rainfall from 50mm to 300mm flooding potential map, based on rainfall data and hydrological data.
 6. Completion of a set of flood risk maps.
 7. Completion of four sets of water regimen monitoring stations equipment.
 8. Completion of an early warning platform system for flood disaster.

9. Start of the construction project for San Ignacio and Bullet tree village flooding improvement.
10. Completion of the preliminary investigation of standards for flood response operations, and related suggestions for improvement.
11. Completion of one disaster prevention inter-ministerial response team training in Taiwan.
12. Completion of two online disaster prevention training sessions and one on-site training in Belize.
13. Investigation carried out in Belize for community disaster prevention planning.
14. Completion of flood improvement in the San Ignacio urban area, construction of a 532-meter-long drainage ditch and a 20-foot-long drainage culvert.



Image source: ICDF

- Sustainable Goals-



2. St. Kitts and Nevis Enhancing Agricultural Adaptive Capacity to Climate Variability Project

- Background -



- A severe drought occurred in Saint Christopher and Nevis in 2015, causing the total crop output to fall by 31.2 percent from the 2014 figure, affecting national food security and farmers' livelihoods. In response, the country filed a request for assistance from Taiwan. Literature review and fieldwork confirmed that the impact of climate variability and climate change trends are essential issues for St. Kitts' agricultural development. Initial estimates of St. Kitts' agricultural vulnerability revealed that the core problem was the lack of capacity of the country's agricultural sector to respond and adapt to early warning information on climate variability, and that three measures should be adopted to increase the resilience of its agricultural system: establish a data collection mechanism for early warnings; develop and/or introduce crop disaster mitigation and prevention techniques; and increase the availability of agricultural information. When the project is completed, St. Kitts' agricultural agencies will establish an information dissemination mechanism for crop disaster mitigation and prevention so that farmers can use the available information to minimize damage caused by disasters.

- Case & Results -

- As of the end of June 2022, the following activities have been completed:
 1. Establishment of four agricultural weather stations in the most needed areas with expertise from the Council of Agriculture (COA), Executive Yuan, and the Central Weather Bureau (CWB). These stations have started real-time data collection (<http://www.agromet.kn/>).
 2. Visit of three officials of cooperating units in St. Kitts and Nevis to the Central Weather Bureau to undertake technical training in basic weather forecasting and reporting.
 3. Technical consultation and capacity building by two Taiwanese experts dispatched to St. Kitts and Nevis.
 4. Establishment of one demonstration farm and four demonstration fields, with 11 crop cultivation trials

undertaken and disease and pest monitoring in response to extreme weather conditions. In addition, one annual report on crop disaster mitigation and prevention techniques was published.

5. Delivery of on-site capacity building for officials of cooperating units and completion of four SOP manuals (weather station maintenance, on-site data collection, digital image processing, and soil fertility evaluation).
6. Development of social media group that made 96 announcements on crop disaster mitigation and prevention.
7. Organization of 22 events to teach farmers how to make use of agricultural information.
8. Organization of seven events to teach farmers how to use climate-resistance cultivation skills.
9. Establishment of one agricultural information platform (<https://goo.gl/gpmExX>) and compilation of an annual report on agricultural information dissemination.
10. Production of one "Suitable Crop Cultivation Map" and one "Annual Climate Risk Calendar in St. Kitts and Nevis."



Image source: ICDF

- Sustainable Goals-



3. Improving Community Resilience in the Dry Corridor of Honduras Project

- Background -



- Disaster resilience has become one of the major topics in the international humanitarian aid community. Honduras is considered one of the world's most vulnerable countries to climate risks and natural disasters. The southern region of Honduras, which is part of the Dry Corridor in Central America, has suffered from one of the worst droughts in decades. In line with global trends and to assist in addressing the recurrent drought situation, the project aims to enhance resilience to multi-threat scenarios, focusing on drought in communities located in the Dry Corridor of Honduras.

- Case & Results -

- Overall, the project will:
 1. Increase the local population's knowledge and skills to manage climate variability risks.
 2. Improve capacity of local emergency committees for monitoring and forecasting droughts.
 3. Implement small-scale water storage infrastructures in the target communities.



Organization of community disaster training courses

Image source: ICDF



Construction of small community water storage facilities

Image source: ICDF

Organization of farmer field training

Image source: ICDF



- Sustainable Goals-

