

WMO Capacity Development Strategy

Template for reporting good practices on capacity development

Purpose of collecting Case Studies: Collect a set of national and multi-national good practice cases demonstrating the application of the WMO Capacity Development Strategy (WCDS) strategic approach and principles in various local/regional environments. The initial set of cases will be included in the revised WCDS, presenting one example from each WMO region.

Note: As part of the implementation actions based on the WCDS, WMO will establish an online platform for promoting good CD practices which will be integral part of the WCDS Implementation Guidelines.

Case Title: Meteorology for the Capacity Development in Underdeveloped Areas - A case study of Tuquan County, Inner Mongolia, China

Country(ies) involved (both beneficiaries and providers of CD support): **China**

Provider: CMA Department of Disaster Risk Reduction (DDRR), CMA Training Centre (CMATC)

Beneficiaries: Most developing and least developed countries and regions like Iran, Indonesia, Nigeria etc..

The proposed case is designed to show how to help selected underdeveloped regions and meteorological and hydrological services (MHSs) in China improve their capabilities and service skills by giving play to the advantages of meteorology in science, technology and organization to facilitate the achievement of sustainability, taking into account the national goal of poverty alleviation and reduction and the goal of the 2030 Agenda of the United Nations.

CD Dimension addressed (select more than one as necessary):

Institutional ; Technological ; Information and Services ; Human resources

Purpose of the CD action/initiative: (briefly describe what CD assessment has been used to identify gaps and main capacity gaps being addressed)

As required in the national strategic plan and taking advantage of its resources in meteorological science and technology, the China Meteorological Administration (CMA) has provided weather, climate, hydrological, environmental and other related information and services tailored for Tuquan, an underdeveloped county in northeastern China. In particular, in terms of infrastructure, advanced technology, science and technology, and management, CMA has given play to the advantages of its resources in meteorological science and technology to provide investment and targeted assistance to the local government, agriculture and animal husbandry, and people in an effort to fill and narrow the local gap in capacity for being sustainable.

Case description – actions taken, target groups, partnerships: (up to 700 words; try to structure based on the WCDS CD Cycle: Assess-Engage-Design-Implement-Evaluate).

It has long been China's national strategy to help its underdeveloped regions reduce poverty. CMA has given full play to the advantages of meteorological science and technology and the unified governance of the national meteorological services as a sector to make meteorological contributions to the goal of poverty reduction and relief in China's underdeveloped areas by improving their capabilities in meteorological disaster prevention and mitigation, the supply of agricultural meteorological services, and the meteorological support for ecological civilization. In this process, CMA has led the establishment of the rural meteorological disaster prevention and mitigation and agrometeorological service systems as a game-changer in this connection. In this case, Tuquan County, Inner Mongolia Autonomous Region (IMAR), northeastern China is selected to show that in helping

Tuquan comprehensively reduce poverty, how CMA has given full play to its advantages in meteorological science and technology to allow those local industries closely related to weather and climate to improve their efficiency in translating advanced scientific and technological achievements into economic benefits, to assist local managerial and technical personnel in improving their management skill and scientific literacy, and to popularize meteorological science among the whole people. Specifically:

-- **Improve the local capacity to apply science and technology.** By providing advanced meteorological monitoring, forecasting and service technologies, such as additional weather radars and sounding equipment installed in places prone to meteorological disasters, meteorological satellites used to provide services and products, more intensive meteorological data used to provide particular monitoring and forecasting products, soil monitoring and analysis laboratories put in place, solar and wind energy exploited, to help the recipient improve its work in weather and climate with science and technology.

-- **Improve the local capacity to serve industries.** By providing targeted agricultural and animal husbandry technologies and resources, such as particular zonation of agro-climate, demonstration of crop varieties, popularization of replicable meteorological technologies for protected agriculture, introduction of the animal husbandry improvement and veterinary epidemic prevention service system, and the provision of relevant technical training, to register increased economic benefits therefrom.

-- **Give play to the capability in resource integration.** The unified national organization and management of meteorological services as a sector was taken advantage to help underdeveloped regions improve their capabilities. For example, a number of plans and programs such as work plan, emergency plan and action plan were formulated as a multi-stakeholder joint effort to promote local capacity; the particular zonation of agricultural climate was furthered to optimize agricultural planting structure, protect and utilize local black soil resources; unique climate resources were tapped with such activities as labeling Tuquan as the Natural Oxygen Park (NOP) and with the Climate-based Quality Assessment of purple garlic to promote local economy.

Application of WCD principles and CD cycle: (provide a brief assessment how the six principles have been followed in your good practice case: P1: Holistic approach; P2: Sustainability; P3: Prioritization; P4: Efficiency and Innovation; P5: Cooperation, partnerships, equity and inclusion; P6: Result-based CD)

Lessons learned and recommendations for wider application:

P1: Holistic approach

With the goal of helping the recipient reduce poverty in mind, CMA, the Tuquan government and the IMAR Meteorological Service have adopted a holistic/systematic approach, with a top-down value chain formed through overall planning at the strategic level, detailed breakdown of specific tasks, integration of meteorological technology into industries, special training for personnel skills, and overall improved competence of all staff in attempt to upgrade the agricultural industry and increase grain production and farmers' incomes.

P2: Sustainability;

The strategic cooperation among CMA, IMAR and the Ministry of Agriculture and Rural Affairs (MARA) has been strengthened to ensure a continuous provision of technical and resource support for the sustained local capacity building.

1. Policy documents used as guidance: The Emergency Plan of Tuquan for Meteorological Disasters, the "Meteorology +" Enabling Action Plan of Tuquan, and the Work Program of Assisting Tuquan in Fully Improving the Capacity Building of Meteorological Support in Service of Rural Revitalization (2022-2024) have been printed and distributed;

2. Underpinned with management mechanisms: Such mechanisms have been established or improved: the system of designating key offices for meteorological disaster prevention and reduction, the "three call and response" mechanism for major meteorological disaster warning, the "four stop" mechanism for high-level meteorological warning signals, the emergency co-response and information sharing mechanism for

meteorological disaster prevention and reduction, and the grid-based management mechanism for meteorological disaster prevention and reduction;

3. Supported with coherent sector action: CMA together with the National Rural Revitalization Administration (NRRRA), the Ministry of Natural Resources (MNR), the Ministry of Emergency Management (MEM) and others has promoted the establishment of a long-term mechanism to prevent poverty returning due to disasters in a bid to empower the underdeveloped Tuquan sustainably.

P3: Prioritization;

In spite of limited human, material and financial resources, priority has been determined according to the capacity gap and the urgency of social and economic development needs in Tuquan, and assigned to the development of five systems, including disaster prevention, agrometeorological services, tourism meteorological services, new energy meteorological services, meteorological services for ecological civilization, and urban meteorological services, with the action plans for a more capable Tuquan materialized in turn.

1. The meteorological disaster prevention framework: The shutdown system for major meteorological disasters and the "call and response at three levels of county, township and village" mechanism for meteorological disaster emergency response, and the system of designating key offices for meteorological disaster prevention have been established, while the countywide emergency command platform for disaster prevention and reduction upgraded and improved. Risk warning services have been launched for such disasters as gale, rain/snowstorm and urban waterlogging. The product of temperature change analysis has begun to be available at key times when urban heating starts and stops. Monitoring and forecasting of meteorological disasters for road traffic such as road icing, heavy fog, snowfall and rainstorm have been strengthened.

2. The agrometeorological service framework: The agroclimatic resource zonation and the planting zonation of major agricultural varieties in Tuquan have been prepared to provide meteorological forecasts for key growth periods of major crops, agrometeorological disasters, weather-based pest and disease; the observation and intelligent processing of meteorological elements and data like high-standard farmland light, heat and water strengthened; diverse and particular products of agrometeorological services released; replicable meteorological technologies for protected agriculture introduced, and advanced scientific and technological achievements deployed in due time;

3. The new energy meteorological service framework: The annual assessment of Tuquan's solar energy resources has been made to provide relevant energy enterprises with forecasts for wind and solar energy resources and warning for severe weather like thunderstorm and gale and their derivatives.

4. The tourism meteorological service framework: The investigation of meteorological disasters in scenic spots has been made, with the emergency plan prepared. A mechanism has been introduced to jointly release relevant regional meteorological service information. Forecast services for the best viewing period of major scenic spots have begun to be available. The investigation of meteorologically driven landscapes with a meteorological condition analysis has been made, with the NOP designation for Laotou Mountain facilitated.

5. The meteorological service framework in support of ecological civilization: Satellite remote sensing and other means have been used for strengthened real-time fire monitoring and high impact weather forecasting and warning, meteorological monitoring and assessment of the countywide vegetation and ecological quality, standardization of operation sites and intelligent transformation of weather modification operation equipment, strengthened safety supervision in key aspects such as station, equipment, personnel, ammunition, joint inspection of and emergency drills for weather modification, and emergency support in case of major disasters.

P4: Efficiency and Innovation;

Efforts have been made to explore how to scale up demonstration in key areas and to offer better designed and tailored training to improve efficiency..

1. Build the capacity quickly with the deployment, application and transformation of advanced technologies: The selection and designation of agro-meteorological research workstations as

demonstration sites. Advanced systems or technologies such as "the quantitative assessment, prediction and warning system of an ongoing agricultural drought", "the forecasting system of particular farmland irrigation", "the system of meteorological services for direct water-saving irrigation ", "the particular climate zonation of corn varieties", "the technology for particular meteorological services for protected agriculture" and "the CLDAS soil moisture query system" have been introduced and transformed locally.

2. Boost the deployment of technologies with flagship demo sites: An intelligent water-saving irrigation demonstration site of "meteorology + high standard farmland" has been designated in Taiping Township, Tuquan County, in which automatic observation instruments for farmland microclimate and crop growth have been deployed and installed. The soil moisture grid-based monitoring and forecasting products integrated with meteorological satellite remote sensing and ground observation data for high-standard farmland, and the water-saving irrigation meteorological diagnosis and forecasting technology have been developed and applied to keep farmers hourly informed with monitoring of soil moisture by 'plot' of one particular kilometer grid and with a particular irrigation volume prediction of a 10-day forecast lead time.

3. Classify and tailor training for various local personnel: Training has been offered to local grassroots cadres to help improve their management and professionalism. The messenger development program has been launched to mainstream meteorology into local fields. Agricultural experts have been invited to give science and technology lectures, offering field guidance and technical extension at the farmland level. In the process of guiding local farmers to apply fertilizer scientifically and accurately by plot according to the soil nutrient content, the training of samplers, inspectors and testers was strengthened. In the process of demonstrating and popularizing the improved breeding technology of frozen semen of cattle and the improved technology of crossbreeding of multi-line sheep, the whole staff training was held for 384 livestock diagnosis, treatment and epidemic prevention personnel in the county to scientifically reduce breeding risks. Folk art entertainments with local characteristics on disaster prevention and reduction were developed and staged on theme tours in many villages to raise the awareness of the public in this connection.

P5: Cooperation, partnerships, equity and inclusion;

1. CMA has led the process as a planner: CMA has taken the initiative to give play to the strength of its national meteorological structure, reinforcing the coherence in action at the national, provincial, municipal and county levels as a synergy. The Work Plan for Targeted Assistance in Tuquan in 2022 and the Work Program for Helping Tuquan Comprehensively Improve the Capacity Building of Meteorological Services in Support of Rural Revitalization (2022-2024) have been issued as a general roadmap with detailed milestones in this connection.

2. Co-management with other ministries: CMA, in conjunction with NRRB, MNR, MEM and others, has issued the Notice on Establishing and Improving a Long term Mechanism for Preventing Poverty Returning from Disasters in an attempt to jointly bring such a mechanism into fruition. The mechanism of joint consultation, joint issuance and joint warning ("three joint" for short) with 12 ministries and commissions of, among others, natural resources, transportation and water has been established. Under the umbrella of cooperation and collaboration between ministries and enterprises, the meteorological sector has begun to cooperate with enterprises like Youyan Institute of Resources and Environment Technology and Fujing Tiance Company for technology research and development, the outputs from which will be implemented and deployed in Tuquan in a timely manner. Cooperation has also gone to well-known e-commerce companies such as Benlai.com and JD.com to build an online special area for supported Tuquan consumer products. The online sales channel has been enabled as a long-term mechanism for social consumption assistance;

3. Positive response from Tuquan government: The People's Government of Tuquan County has issued the Emergency Plan for Meteorological Disasters in Tuquan and the "Meteorology +" Enabling Action Plan of Tuquan in response to the support initiative by CMA in order to jointly deliver meteorological services to ensure the local economic and social development.

P6: Result-based CD

1. The enhanced and planned organization and management: A leading group has been set up for a regular review of the improved capacity of Tuquan, with the existing problems discussed and addressed in a timely manner, and the follow-up actions elaborated upon and mapped out according to the plan.

2. The field fact-finding tour: The competent CMA administrator has led the evaluation expert team to the beneficiary for a field investigation, including an on-site inspection and guidance on relevant capacity improvement activities, and a timely correction and remedial of problems and deficiencies identified in this connection.

3. The working mechanism for reporting progress: Thanks to this mechanism, a robust scheduling practice has been ensured to coordinate and promote routine work; the implementation of the respective responsibilities of the internal offices of meteorological services, the directly affiliated organizations, and relevant provincial (regional, municipal) meteorological services; and to give a clear picture of the exact reality including gaps and allow for timely adjustments and improvements according to the progress.