



Competency Based Framework (CBF) for Hydrology Officer and Meteorology Officer

2021

National Center for Hydrology & Meteorology (NCHM)

Royal Government of Bhutan

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1. Background

1.1 About National Center for Hydrology and Meteorology (NCHM)

The National Center for Hydrology and Meteorology (NCHM) is an autonomous scientific and technical agency of the Royal Government of Bhutan responsible for understanding the behaviors of atmosphere, its interaction with cryosphere and water bodies, the weather and climate and distribution of the country's water resources. It is identified as the nodal agency responsible for generation of information and delivery of products and services on weather, climate, cryosphere and water resources in Bhutan. The Centre was established in January 2016 as per the recommendation of the Organization Development (RCSC 2014)) approved by the Cabinet during its 92nd Lhyengye Zhungtsog (LZ) Meeting held on 11th December 2015. In order to streamline the organizational mandates and functions and avoid duplications, based on the Cabinet directives the mandates and manpower of the Glaciology Division from the Department of Geology and Mines (DGM, MoEA) and Aeronautical Meteorological Services from the Department of Air Transport (DoA), MOIC was transferred to the new Center. Approval of the ODE recommendation of RCSC was conveyed by the Cabinet Letter No. C-3/92/169 dated December 25, 2015. The Center was formerly delinked from the Ministry of Economic Affairs with effect from 1 February 2017.

The Center is mandated to provide scientific and technical services in hydrology, water resources, meteorology, climatology, and cryosphere to ensure the safety, socio-economic well-being of society and to support national and international needs.

The Center is the designated national focal point of international scientific organizations like World Meteorological Organization (WMO) and Intergovernmental Panel for Climate Change (IPCC). The Centre also follows WMO guidelines for efficient service delivery.

1.2 Brief History of Institution development of Hydro-met in Bhutan

Prior to 1990's hydro-meteorological data were collected by the respective line agencies to fulfil their own requirements. Since the biggest user of hydro-meteorological data in the country was the Department of Energy (DoE) erstwhile Department of Power (DoP) for planning, designing and development of hydropower projects, during the Power System Master Plan (PSMP) study project (1990-1993), an organization equivalent to the National Hydro-meteorological Services of other countries was established under the DoP by taking over meteorological stations and functions from the Ministry of Agriculture (MoA) and mandated with the national responsibility for hydro-meteorological data collection, processing, and dissemination.

Hydro-met Services Division (HMSD) with three sections: Hydrology, Meteorology and Flood Warning Section was created as one of the divisions under the Department of Energy as a part of the restructuring process of the energy sector in 2002. The HMSD was upgraded to the new Department of Hydro-met Services (DHMS) when the Department of Energy was restructured into three new Departments in 2011. The Department of Hydro-met Services operated under four functional divisions: Planning Coordination and Research Division (PCRD), Hydrology Division (HD), Meteorology Division (MD) and Snow and Glacier Division (SGD). Further the recent OD exercise carried out by the RCSC recommended that the Department of Hydro-met Services be

established as an independent organization as weather, climate, water and related environmental services are required by all sectors for decision support in planning, policy and practices. A National Centre for Hydrology and Meteorology (NCHM) was created in 2016.

Chronology of organizational development of hydrology and meteorology services in Bhutan.

Year	Organization
Prior 1990	<p>Hydro-met data collection was done by respective line agencies based on their own need on a piecemeal basis through projects implemented by the respective agencies.</p> <p>Department of Agriculture was responsible for collection of meteorological data for agriculture and other RNR uses;</p> <p>Hydro-met Unit (Program funded by GoI) under the Department of Telecom was responsible for collection of river level and rainfall data for providing flood warning information to the Indian States of Assam and West Bengal.</p>
1990-1993	<p>The Hydrology Unit and Meteorology Unit were established under the Department of Power (DoP), Ministry of Trade and Industry (MTI) to collect hydrological and meteorological data.</p> <p>Under the Bhutan Power System Master Plan (PSMP) study, hydrological and meteorological network were designed and established covering whole Bhutan;</p> <p>Meteorology functions from the Department of Agriculture were transferred to DoP, MTI along with instrument and manpower.</p>
2001	<p>As a part of restructuring the energy sector and unbundling of the Department of Power (DOP) MTI, the following agencies were created:</p> <ol style="list-style-type: none"> 1. Department of Energy, DoE (Policy and Coordination), 2. Bhutan Power Corporation, BPC (transmission and distribution functions), 3. Druk Green Power Corporation, DGPC, (generation functions) and 4. Bhutan Electricity Authority, BEA (as regulator). <p>The Hydro-met Services Division (HMSD) was one of the divisions created under the Department of Energy (DoE) with three sections, viz.: Hydrology, Meteorology and Flood Warning Section.</p>
2002	<p>When the Department of Telecom (DoT) was corporatized in 2002, the Hydro-met Unit with its observational network, functions and manpower was handed over to the DoE.</p> <p>Hydro-met Unit was renamed as the Flood Warning Section under the HMSD, DoE.</p>
2011	<p>As per the decision of 67th Session of Lhyengye Zhungtsog (LZ) held on 30th March 2010 the Department of Energy (DoE) was restructured into three new departments, viz.: Department of Hydropower and Power Systems (DHPS), Department of Renewable Energy (DRE) and Department of Hydro-met Services (DHMS).</p>

	The Department of Hydro-met Services (DHMS) operated with four functional divisions: Planning Coordination and Research Division (PCRD), Hydrology Division (HD), Meteorology Division (MD) and Snow and Glacier Division (SGD).
2016	<p>As per the recommendation of the Organization Development) Exercises (ODE) carried out by the Royal Civil Service Commission (RCSC), the Cabinet during its 92nd Lhengye Zhungtsog (LZ) Meeting held on 11th December 2015 approved the establishment of National Center for Hydrology and Meteorology (NCHM) from erstwhile Department of Hydro-met Services, MoEA. The Center was formally established in September, 2016 and was delinked from the Ministry of Economic Affairs in January 2017.</p> <p>Some of the mandates and functions from other agencies were also handed over to the Center to streamline and avoid duplication during the process of institutional reorganization.</p> <ol style="list-style-type: none"> 1. Glaciology Division was handed over from Department of Geology and Mines (DGM), MoEA to NCHM 2. Aviation Met Services from Department of Air Transport (DoAT), MoIC to the Center.

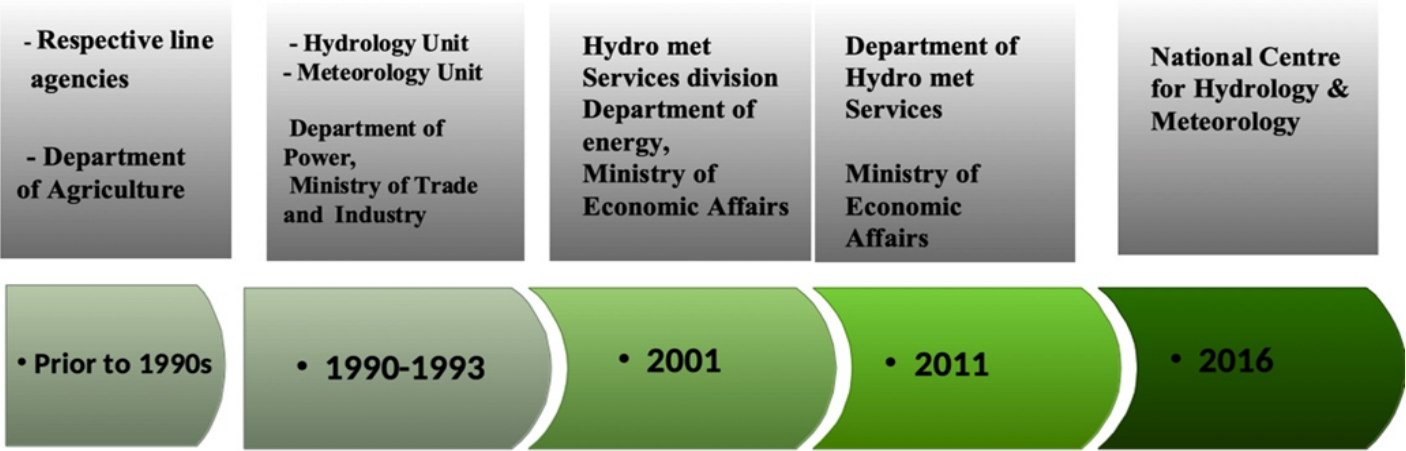


Figure 1: Timeline of meteorological and hydrological + Services in Bhutan

1.3 Vision, Missions and Core values of the Center

1.3.1 Vision

- Center of excellence in Hydrology, Meteorology and Cryosphere Science and Services.

1.3.2 Mission

Monitoring and understanding of hydrology, weather, climate and cryosphere, for timely provision of information and services to protect lives and property and support national needs for ecologically balanced sustainable development and provide quality, accurate, reliable, usable, location-specific and timely services to reduce risks and to optimize benefit in the following areas:

- Create value and enhance societal benefits from hydro met resources for Sustainable development;
- Protect life, livelihood and development infrastructure from hydro met hazards.
- Safeguard the environment
- Ensure continuity of hydro met monitoring and observations
- Promote endogenous capacity building
- Meet international commitments and contribute to international cooperation

1.3.3 Core values

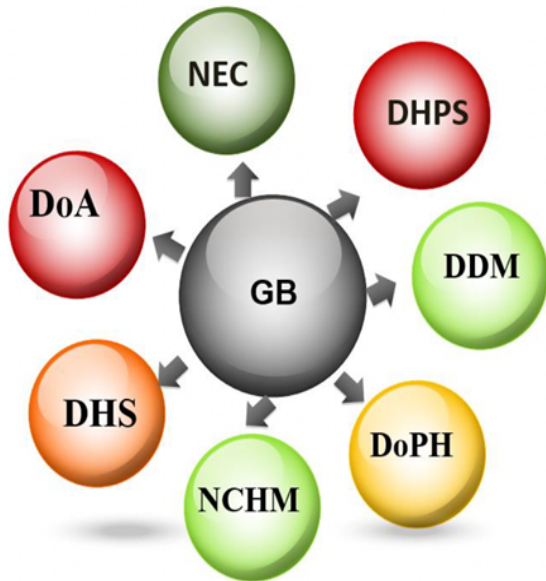
- Commitment and loyalty in delivery of products and services Integrity;
- Professionalism in support of science, research, objectivity, impartiality, and excellence;
- Mutual respect, cultural sensitivity and non-discrimination.

1.3.4 Goals

- Improve result-based decision support service for weather incidents and events that threaten lives and livelihoods;
- Enhance climate services to understand and adapt to climate-related risks;
- Develop capacity to provide integrated and coupled monitoring, detection and forecast services to support assessment and management of water resources and hydro-meteorological hazards;
- Build competence to provide sector-relevant information for socio-economic development, and support development of integrated environmental services to foster healthy communities and ecosystems;
- Sustain highly skilled professional workforce equipped with training, tools and infrastructure to fulfil the mission.

1.4 Governance and Structure

The National Center for Hydrology and Meteorology (NCHM) is an autonomous organization of the Royal Government governed by a Governing Board (GB) consisting of members from relevant organizations as shown in the figure below:



GB composition:

1. Secretary, National Environment Commission Secretariate (NEC)- Chair
2. Director General, Department of Disaster Management (DDM), MoHCA - Member
3. Director, Department of Hydro Power and Power Systems (DHPS), MoEA - Member
4. Director, Department of Agriculture (DoA), MoAF
5. Director, Department of Public Health (DoPH), MoH - Member
6. Director, Department of Human Settlement (DHS), MoWHS- Member
7. Director, National Center for Hydrology and Meteorology (NCHM)- Member Secretary

1.4 Mandates and Functions of NCHM

The Center is mandated to provide scientific and technical services in hydrology, water resources, meteorology, climatology, and cryosphere to ensure the safety, socio-economic well-being of society and to support national and international needs.

The following are the main functions of the Center:

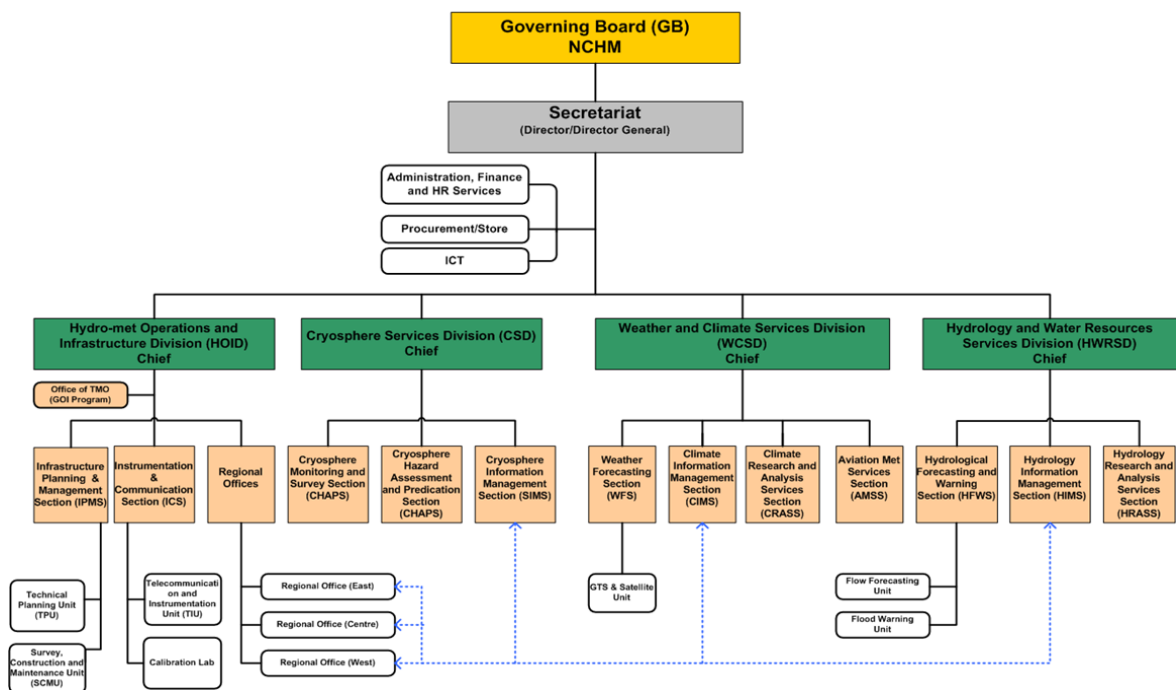
- a. Establish and operate National Observation network and telemetry system for weather, climate, cryosphere, hydrology and water resources;
- b. Maintain national database (repository) of hydrology, meteorology, cryosphere and related environmental data and information;
- c. Provide Public Weather Services (PWS), climate services, agro-meteorology, climate projection and aviation meteorological services.
- d. Provide hydrological forecasting (flow and flood), and water resource assessment. Assessment and mapping of hydro-meteorological and GLOF hazards, and provide Early Warning Services;
- e. Study and monitoring of snow, glaciers and glacial lakes and assess associated risks for mitigation and adaptation;
- f. Promote and conduct research on cryosphere, meteorology (weather and climate), hydrology and water resources;

- g. Enhance human resources development and professional capacity in the field of hydro-meteorology and cryosphere services;
- h. Promote and facilitate standardization of hydro-met instruments, methods of observation and recording;
- i. Establish collaboration and linkage with national, regional and international organizations in the areas of cryosphere, meteorology (weather and climate), hydrology and water resources.

1.5 Organization

The National Center for Hydrology and Meteorology (NCHM) is organized into the Office of the Director, Secretariat Services, one operational and three services divisions based on subjects and technical knowledge that would require specialization to perform the functions and effective management and deliver the hydromet services.

- a. Office of the Director/Director General;
- b. Secretariat Services (Policy and Planning, Administration and Finance, HR Services, Procurement/Store and ICT)
- c. Hydro-met Operations and Infrastructure Division (HOID)
- d. Cryosphere Services Division (CSD)
- e. Weather and Climate Services Division (WCSD) and
- f. Hydrology and Water Resources Services Division (HWRSD)



1.6 Human Resource

Meteorology, Climatology, Hydrology, Limnology, Glaciology and aviation meteorology are the main branches of earth sciences and works NCHM performs are highly technical, science based and interconnected. Therefore hydro-met services delivery requires a multi-disciplinary team. As per the WMO, National Meteorological Hydrological Service (NMHS) requires four main categories of technical professional besides administration, finance and human resources management and Development, ICT and Media.

- a. Field Observers
- b. Technicians
- c. Professional
- d. Specialist

1.7 Services provided by NCHM

To achieve the mission, NCHM carries out many operational functions to deliver high-quality, usable products and services. NCHM focuses on research and services, leveraging the institutional arrangement of operational meteorology and hydrology under single management. As a party and a member of World Meteorological Organization (WMO), services developed and provided by NCHM are guided by the Global Framework for Climate services (GFCS) and the National Framework for Climate Services.

Accordingly, NCHM provides services on following broad thematic areas.

- a. Hydromet Observation and data services
- b. Public Weather Services
- c. Climate services (Climate projection, seasonal prediction and climate outlooks etc.)
- d. Agrometeorological Services
- e. Aviation meteorological services
- f. Hydrological Services (data, flow/flood modeling and forecasting etc.)
- g. Cryosphere monitoring, bathymetric survey, mapping and risk assessment and data services
- h. Flood/GLOF Early warning services

1.8 Role of NCHM

1.8.1 Legal Basis:

Meteorology and hydrology are statutory under the Constitution, environmental, water and disaster legislations, under which hydro met activities are either explicit or implicit under relevant stipulations. These legal and other quasi-legal instruments give varying degrees of authority for institution, operation and management of hydro met functions of the Royal Government for accrual of socioeconomic benefits and environmental preservation. In particular, the authority of Water Act, NEPA, F&NC Act, DM Act, EA Act and Bhutan Civil Aviation Act mandate an organized and integrated governmental effort in a National Hydro met (Hydrological and Meteorological) Services providing crucial support to fulfilling its missions

NCHM autonomous technical and scientific agency of the Royal Government was established in 2016 based on the Organization Development (OD) Recommendations of the RCSC approved by the Cabinet during its 92nd Lhyengye Zhungtsog held on 11th December 2015 vide Cabinet Letter No. C-3/92/169 dated December 25, 2015.

Climate Change Policy of the Kingdom of Bhutan (2020) mandated NCHM to provide national sources of hydro-meteorological data, service and advice to meet the needs of the general public, emergency services and other specialized users; and to provide hydro-meteorological data and information, climate modelling and scenarios and other early warning services. In accordance to the Section 108 of the Disaster Management Act of Bhutan 2013, NCHM is designated as the Hydro-met Hazard Early Warning Service Provider in the country to ensure early warning system for identifying Hydro-met hazards and to notify all vulnerable populations and responding agencies of the threatening disaster situation or disaster in the country vide Government Order no.C-2/2019/369 dated December 05, 2019 issued by the Hon'ble Prime Minister of Bhutan. Bhutan Civil Aviation Authority (BCAA) has designated NCHM as the National Aeronautical Meteorological Service Provider (AMSP) within Bhutan, the latest certificate of designation is BCAA/ANS-D&N/27/002 dated May 03, 2018 to provide air navigation services.

By international agreement, WMO convention designates its member's focal agency as the competent authority for official hydro met services.

Organizational legitimacy underpins the NCHM standing for successful operation with clarity in the definitions of its mission, mandate and responsibilities with matching authority; gain recognition of its contribution to society; facilitate allocation of adequate resources; demonstrate how the government will meet its obligations under various international agreements. Therefore, its legal status as the official and authoritative provider of hydro met forecasts and warnings is implicit in the cabinet endorsements.

1.8.2 International Linkages and Collaboration

The Royal Government of Bhutan is a party to WMO convention, ICAO, UNFCCC, IPCC, UNCCD, Sendai Framework for DRR, SDG, bilateral MOUs, twinning, SAARC, BIMSTEC, ICIMOD, among others. The NCHM is the designated national focal point for the World Meteorological Organization (WMO) and the Intergovernmental Panel for Climate Change (IPCC). The Head (Director/Director General) of the Center is designated as the Permanent Representative (PR) of Bhutan with WMO. Together with other agencies, the NCHM represents the government's interests and positions in fulfilling relevant international commitments and further national interests through participation in the appropriate international programs and activities.

1.8.3 National Collaboration and Partnership weather, climate and water resources including cryosphere are cross sectoral and data and services are required by all the sectors.

Therefore, the provision and effective use of hydro-met and related information depends on cooperation among many different stakeholders. It will be very important for the Center to enhance partnership with national stakeholders for enhancement and utilization of hydro-met technology, knowledge and data exchange.

As an essential component of the national infrastructure, the new agency will continue to be government owned, government funded and its main customer in supporting other government sectors to achieve their own missions. The government is responsible to ensure services are user-tailored and usable, clarify relationships to minimize duplication of efforts and advocate its contributions and benefits thereby raising its visibility. The constructive relationships and partnerships with the media must be strengthened as media offer an important means of delivering forecasts and warnings to the public. The collaboration and Institutional linkages with relevant government, non-government and academia should be elaborated further into meaningful partnership to serve common interests and deepen mutual benefits. The NCHM presently has signed MOU with colleges under the Royal University of Bhutan, Ministries, Agencies, NGOs and other relevant sectors to enhance our collaboration in research and partnership to enhance the observations.

1.9 Capacity development needs at NCHM

Well trained staff are essential for provision of the highest quality services. The advances in scientific knowledge and technology have led to more accurate forecasts and improvement of the quality of hydro-met services. To enable hydro-met service providers to respond appropriately to the increased demand for hydro-met information in the face of negative impacts of adverse hydro-met events on various socio-economic sectors, the RGoB support in the capacity development through education and training to abreast with changing technology and science is a priority to:

- a. Ensure staff undergo continuous professional development in line with the national and international standards;
- b. Provide basic Hydro-met Operational training for Hydro-met Technicians,
- c. Ensure that NCHM has sufficient staff equipped with necessary skills, knowledge and competencies, which are continuously refreshed
- d. Develop Competency Frameworks for operation of hydro-met observation and instrumentation, delivery of public weather services, aviation meteorological services, flood forecasting and early warning services and other related services;
- e. Ensure that national and international standards are maintained in accordance with WMO and ICAO requirements when developing curricula through any training and competency programs;
- f. Develop professional skills of human resource through provision of educational material and awarding fellowships;
- g. Coordinate and conduct basic hydro-met operational training for monitoring, observation and collection of data;
- h. Establish training facilities in line with the current International Operating Standards, Practices and Procedures (WMO Manual No. 1083);
- i. Foster collaboration with relevant Colleges/Universities and training institutions in the fields of meteorology, hydrology and cryosphere science etc.

NCHM needs to emphasize on a holistic and integrated approach to building and developing competencies and capabilities of NCHM employees through professional training and development, technical training and project management. Workforce capabilities refer to the skills and knowledge of the workforce making up the ability to achieve an outcome for the NCHM. Competencies refer to the ability to accomplish specific tasks. The objective is to enhance the

ability of staff, organization and society as a whole to perform, sustain and self-renew, solve problems and meet their own objectives on a sustainable basis.

Training will include: Hands-on, on-the-job training, component of development project, job exchanges or attachments, secondment, seminars, short courses, workshops, conferences, higher education programs, self-training, DIYs. Besides, NCHM shall run an in-house training and staff development centre for tailored, specialist courses in scientific and technical topics. Focal areas for education and training – tropical meteorology, mountain meteorology, agricultural meteorology, aviation meteorology, satellite meteorology, disaster risk reduction, forecasting and modelling, environment, mountain hydrology, hydro-metrics and instrumentations, monitoring and observation, data management, processing, analysis and synthesis, ICT, telecommunication, broadcast, media publishing, glaciology, snow hydro-meteorology, geomorphology, communication and public relations, management.

2. Competency-Based Framework for Hydro/Met Officer

2.1 Introduction

Competency based framework was initiated by the Royal Civil Service Commission (RCSC) with the aim to cultivate the culture of identifying skill needs of employees, assisting continuous development, and professionalizing civil servants to deliver responsibilities effectively and enhancing efficiency. The framework will set the direction for capacity development of civil servants at different proficiency levels aligning to its job responsibilities which will ensure that the HRD budget mobilization and utilization is aligned with the overall vision, mission and mandate of the organization.

The Competency-based Framework (CBF) development process is a more structured, targeted and exhaustive approach of capacity development initiative. It will assist agencies in envisioning critical skill requirements to enhance various human resource functions, particularly in areas such as Performance Management, Succession Planning, Talent Management, and Career Progression. There is no CBF for the employees working under the NCHM, the Center has been using the following World Meteorological Organization (WMO) Technical regulations and guidelines and competency framework document as guide for human resources development and ensuring standards.

- Guide to Competency (WMO-No. 1205), 2018 edition (https://library.wmo.int/doc_num.php?explnum_id=4237)
- Compendium of WMO Competency Frameworks (WMO-No. 1209), 2019 edition (https://library.wmo.int/doc_num.php?explnum_id=10075)
- Capacity Development for Climate Services: Guidelines for National Meteorological and Hydrological Services (WMO-No. 1247), 2020 edition. (https://library.wmo.int/doc_num.php?explnum_id=10272)
- Technical Regulations Basic Documents No. 2 Volume I – General Meteorological Standards and Recommended Practices (WMO No-49), Edition 2019 updated 2021 (https://library.wmo.int/doc_num.php?explnum_id=10844)

- Technical Regulations Basic Documents No. 2 Volume II – Meteorological Service for International Air Navigation (WMO No- 49), Edition 2019 updated 2021 (https://library.wmo.int/doc_num.php?explnum_id=10733)
- Technical Regulations Basic Documents No. 2 Volume III – Hydrology, (WMO No- 49), Edition 2006. (https://library.wmo.int/doc_num.php?explnum_id=4564)
- Annex 3 to the Convention on International Civil Aviation (ICAO)-Meteorological Service for International Air Navigation, Seventeenth edition 2010 (<https://www.icao.int/airnavigation/IMP/Documents/Annex%203%20-%2075.pdf>)

A general Competency Based framework for Hydrology/Meteorology Officers for the Center was developed to enhance the capabilities and efficiency of the Hydro/Met Officers. Under the directives of RCSC, a five-day capacity building workshop on development of CBF for major occupational groups of different agencies under RGOB was conducted from 27th September to 1st October 2021 with technical support from the CBF Master Trainers, starting with this training the National Center for Hydrology and Meteorology developed the Competency Based Framework for Hydro/Met Officers.

2.2 Purpose

The CBF highlights the knowledge, skills and abilities required for Hydro/Met Officers to achieve a high level of professional competence and deliver the highest standard services. The framework is developed with the following aim and objectives.

2.3 Aim

Build a fraternity of Hydro/Met Officers who are highly knowledgeable, skillful and competent in delivering efficient and effective services of the highest standard.

2.4 Objectives

- Ensure alignment of Roles and skills/competency
- Ensure smooth and specialized career path of civil servants
- Ensures that investment in the HR Development areas are strategic: Time, Resource and Quality
- Decentralization of HRD interventions to the agencies with value

2.5 Framework Development Processes

The development of the framework involved identifying Role Profiles, Competency Areas, Key Competencies, Behavioral Indicators and Proficiency Levels through a rigorous, consultative and inclusive process with key stakeholders.

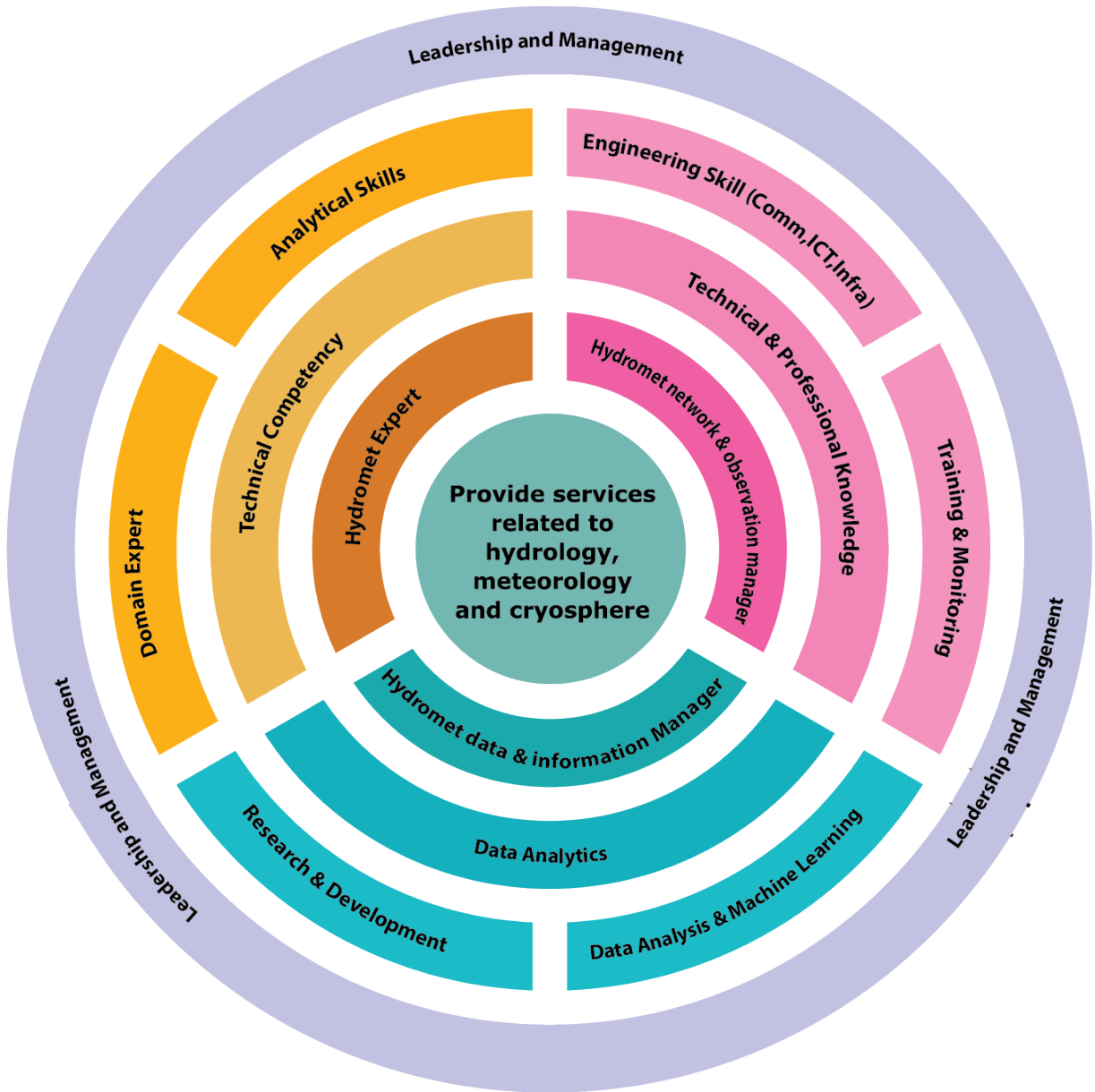
The final draft was presented to the management and was endorsed on 31st December 2021.

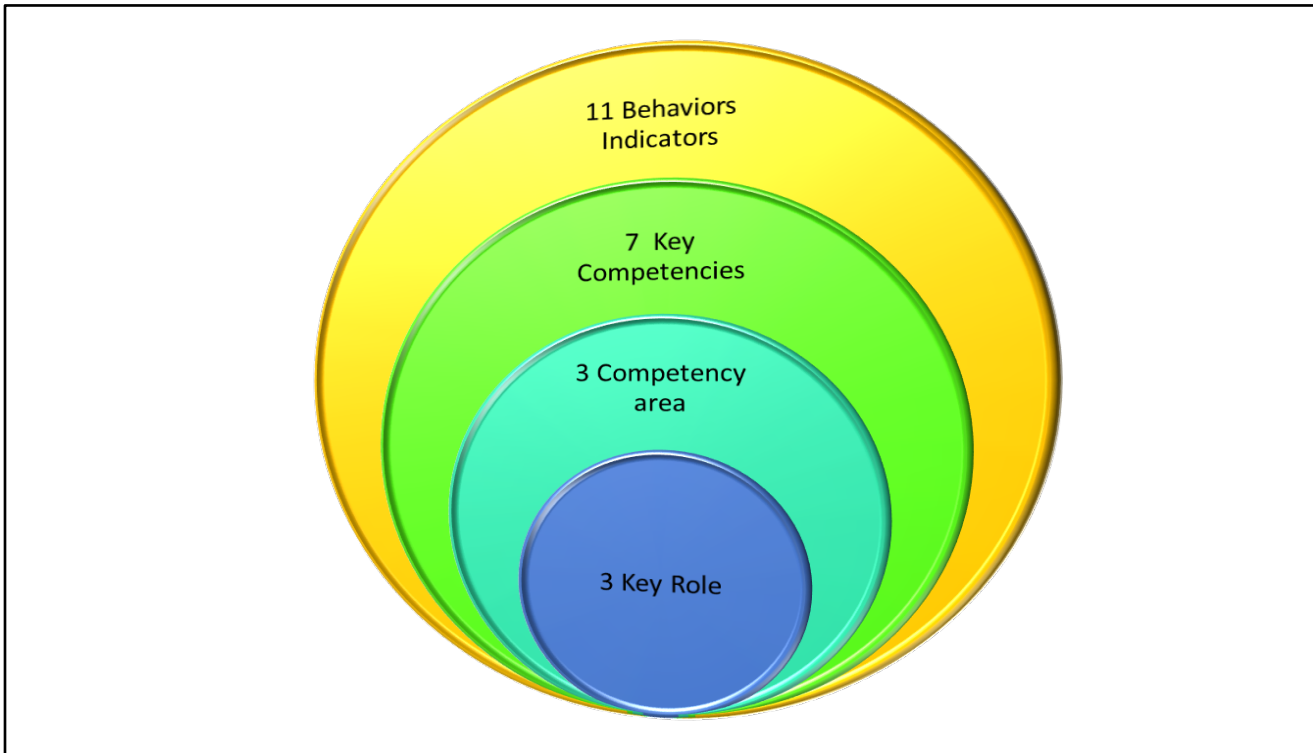


HRC Member

Sl. No	Name	Designation
1	Karma Dupchu	Director
2	Karma	Specialist
3	Dr. Singay Dorji	Specialist
5	Tayba Buddha Tamang	Chief
6	Pashupati Sharma	Offtg. Chief
7	Ugyen Tshomo	Human Resource Officer

2.6 Structure





2.6.1 Identification of Key Role

The key role is an organized set of behaviors that are crucial to achieve the current and future goals of the National Center of Hydrology and meteorology. Following are the key roles expected to be performed by the Hydro/met Officer:

- a. Hydro/met Expert
- b. Hydro/met Network and observation Manager
- c. Hydro/met data and Information Manager

2.6.2 Description of Role Profile

The role profile is the description of roles that Hydro/Met Officers are expected to demonstrate in achieving the outcomes of the National Center for Hydrology and Meteorology. It defines outcomes and competencies for an individual role. It concentrates on outcomes rather than duties, which provides better guidance than a job description on expectations. It does not constrain Hydro/Met Officers to carry out a prescribed set of tasks.

Role Profile of Hydro/Met Officer:

SN	Key Role	Role Description
1	Hydro/met Expert	<ol style="list-style-type: none"> 1. Study and monitor the cryosphere (snow, glaciers, glacier lakes, permafrost) and its associated risks to implement appropriate mitigation and adaptation measures. 2. Study and provide public weather services, severe weather warnings, aviation meteorological services and agro-meteorology 3. Carryout water resources assessment and hydrological forecasting.
2	Hydro/met network and Observation Manager	<ol style="list-style-type: none"> 1. Planning and establishment of national Hydro/meteorological network 2. Operate and maintain Hydro/meteorological observation networks including communication networks and related infrastructure (surface, upper air and Space observations) 3. Conduct capacity and human resources development through training and education. 4. Carryout standardization of hydro-met instruments/systems, methods of observation and recording.
	Hydro/met data and Information Manager	<ol style="list-style-type: none"> 1. Maintain a data management system to process and analyze Hydro/meteorological data for archival and dissemination. 2. Promote and conduct research on cryosphere, meteorology (weather and climate), hydrology and applications of new science and technologies. 3. Coordinate, prepare and share knowledge, outcomes and information of Hydro/Meteorological services.

2.6.3 Identification of Competency Areas

The competency area is the clustering of key competencies by related behavior and functions of each role. It comprises a set of Knowledge, Skills and Abilities (KSA) that result in essential behaviors expected from Hydro/Met Officers. The current framework has identified four competency areas as follows:

Role #	Key Role	Competency Area
1	Hydro/met Expert	1.1 Technical Competency
2	Hydro/met network and Observation manager	2.1 Technical and professional Knowledge
3	Hydro/met data and Information Manager	3.1 Data analytics
4	Common	4.1 Leadership and management

2.6.4 Identification of Key Competencies

The key competency is an observable behavior that indicates the presence of the particular competency. Generally, it is broadly divided as core competency, leadership competency and technical or functional competency. The framework has identified seven key competencies are presented as below:

SN	Key Role	Competency Area	Key Competencies
1	Hydro/met Expert	1.1 Domain Knowledge	1.1.1 Hydrology, Meteorology, Aviation meteorology, cryosphere
			1.1.2 Analytical skills
2	Hydro/met network and Observation manager	2.1 Technical Skills and Professional Skills	2.1.1 Engineering skill (Communication and electronics, ICT, Infrastructure, remote sensing, GIS, satellite, Hydro-met tools)
			2.1.2 Training and Mentoring
3	Hydro/met data and Information Manager	3.1 Data analytics	3.1.1 Data analysis and Machine learning (Big Data and AI)
			3.1.1.3 Research and Development (includes startups, modelling, AI, machine learning, Hydro-met Service development)
4	For all Key Roles	4.1 Leadership and management	4.1.1 Resource Management
			4.1.2 Team Spirit
			4.1.3 Communication Skills
			4.1.4. Strategic Planning

2.6.5 Identification of Behavioral Indicators

The Behavior Indicator is the description of competencies based on various proficiency levels. It outlines a collection of desired and observable motives, traits and behaviors when executing or carrying out the assigned task. It serves as a tool to guide evaluations of employee performance. The framework has identified 11 behavioral indicators.

Key Role 1: Hydro/met Expert		
Competency Area	Key Competency	Behavior Indicators
1.1. Technical Competency	1.1.1. Domain expert.	1.1.1.1. Exhibits sound technical knowledge and keeps updated on latest Hydromet science and technologies.
		1.1.1.2. Applies technical knowledge to carry out job responsibilities.
	1.1.2. Analytical skills	1.1.2.1. Identifies problems and provide solutions for smooth functioning of systems
		1.1.2.2. Analyze Hydro-met system to provide efficient services
Key Role 2: Hydro/met network and Observation manager		
2.1. Technical and professional Knowledge	2.1.1. Engineering skill (Comm, ICT, Infra)	2.1.1.1. Exhibits and apply sound technical knowledge on hydro-met network management systems to enhance hydro-met networks.
	2.1.2 Training and Mentoring	2.1.2.1. Conducts trainings for the Hydro-met technician for quality data
Key Role 3: Hydro/met data and Information Manager		
3.1. Data analytic	3.1.1. Data analysis	3.1.1.1. Ensures quality Data for efficient use.
		3.1.1.2. Manage and interpret data for efficient decision making
	3.1.2 Research and development	3.1.2.2 Demonstrate knowledge in research skills
Key Role: Common		
4.1 Leadership and management	4.1.1 Management	4.1.1.1 Demonstrates effective management of resources for achieving the Centre's goals and objectives
		4.1.2.1 Demonstrates the ability to work in a team for a task to achieve the desired goal.

2.6.6 Classification of Proficiency Levels

The proficiency level is categorized based on the level of expertise. It describes the levels of a competency required to perform a specific job successfully. There is a progression of proficiencies at each level. The proficiency level of Hydro/Met Officers is categorized into four levels as i) Entry (P5-P4), ii) Intermediate (P3) and iii) Experienced (P2) and iv) Advanced (P1). The framework has identified eleven behavioral indicators across four levels of proficiency.

The proficiency will enable individual officials to distinguish the type of competencies expected in their career path, which will give them an opportunity to enhance competency in achieving current as well future career goals. As the officials in position levels of P5 & P4 play similar roles, their proficiency levels are merged together. Further, the proficiency level will set a benchmark for the recruitment and deployment. The proficiency levels of each key competency are detailed below:

Key Role 1: Hydromet Expert			
Competency Area: 1.1 Technical Competency			
Key Competency: 1.1.1 Domain Expert			
Behavior Indicator 1.1.1.1: Exhibits sound technical Knowledge and keeps updated on latest Hydro met science and technologies.			
Entry	Intermediate	Experienced	Advanced
Basic technical knowledge on hydro-met science and technologies.	In-depth and up to date knowledge on hydro-met science and technologies.	In-depth and up to date knowledge on Hydro-met science and technologies. Skilled in specific technical areas.	Comprehensive knowledge and skills on hydro-met science and technologies. Expertise in specific technical fields and related managerial skills.
Behavior Indicator: 1.1.1.2: Applies technical knowledge to carry out job responsibilities.			
Entry	Intermediate	Experienced	Advanced
Assist senior colleagues in carrying out assigned tasks.	Takes lead in carrying out assigned tasks.	Applies technical knowledge to plan the tasks and takes lead in implementing assigned tasks.	Monitor and provide guidance to juniors while carrying out the tasks.
Key Competency: 1.1.2: Analytical Skills			
Behavior Indicator: 1.1.2.1: Identifies problems and provide solutions for smooth functioning of systems			
Entry	Intermediate	Experienced	Advanced
Able to perform task to resolve problems with directive from senior officials	Demonstrate the ability to identify problems, troubleshoot and solve problems.	Identifies problems, provides innovative ideas and solutions.	Anticipates problems and provides appropriate directives, guidance and advisories to mitigate issues in an effective and efficient manner.
Behavior Indicator: 1.1.2.2: Analyze Hydromet system to provide efficient services			
Entry	Intermediate	Experienced	Advanced

Demonstrate basic knowledge on understanding the systems	Apply knowledge on analyzing the systems	Provide guidance to analyze the system	Actively participates with the team while analyzing the system
Key Role 2: Hydro/met network and Observation manager			
Competency Area: 2.1 Technical and professional Knowledge			
Key Competency: 2.1.1 Engineering skill (communication and electronics, CT, Infrastructure, remote sensing, GIS, Satellite)			
Behavior Indicator: 2.1.1.1 Exhibits and applies sound technical knowledge on hydro-met network management systems to enhance hydro-met networks.			
Entry	Intermediate	Experienced	Advanced
Understand the basic principle of hydro-met network systems and assist in monitoring and maintaining of hydro-met network systems.	Takes lead in monitoring and maintaining of hydro-met network systems	Review new and innovative hydro-met network systems and recommend the best suited systems.	Provide guidance and directives on the use of best available hydromet systems.
Key Competency: 2.1.1 Training and Mentoring			
Behavior Indicator: 2.1.2.1. Conducts trainings for the Hydromet technician for quality data			
Entry	Intermediate	Experienced	Advanced
Understand the concept of hydromet network and assist in conducting the training.	Plan and lead the training program	Design the training modules	Review and guide in the development of the modules.
Key Role 3: Hydro/met data and Information Manager			
Competency Area: 3.1 Data analytic			
Key Competency: 3.1.1 Data Analysis			
Behavior Indicator: 3.1.1.1. Ensures quality Data for efficient use.			
Entry	Intermediate	Experienced	Advanced
Oversee that the screened data are up to standard.	Always recommends and provides directives to improve the quality of data.	Always recommends, provides directives and guidance to set new data standards to improve the quality of data.	Review and guide in development of new standards to further improve quality of data. Keeps updated and shares knowledge on new development in global data standards.
Behavior Indicator: 3.1.1.2. Manage and interpret data for efficient decision making			
Entry	Intermediate	Experienced	Advanced

Comprehends and interprets data for efficient data usage	Comprehends, interprets and produce appropriate analysis methods for efficient data usage	Guides, mentors and trains subordinates on advanced analysis and interpretation techniques for efficient data usage.	Leads, provides and recommends innovative ideas and best Analysis and interpretation methods for efficient data usage.
Key Competency: 3.1.2 Research and Development			
Behavior Indicator: 3.1.2.2 Demonstrate Knowledge in research skills.			
Entry	Intermediate	Experienced	Advanced
Understands basic research methodologies	Identifies potential research issues and conduct thematic studies	Ensures integrity, accuracy, and completeness of research finding in compliance with best international research practices.	Advises on the advanced research statistical modelling concept, and interprets and communicates research findings to policy makers.
Common Key Role			
Competency Area: 4.1 Leadership and management			
Key Competency: 4.1.1 Management			
Behavior Indicator: 4.1.1.1 Demonstrates effective management of resources for achieving			
Entry	Intermediate	Experienced	Advanced
Understands and utilizes resource requirements adhering to Centre's goals and objectives.	Effectively assesses and uses resources required to implement action plans and achieve desired results.	Effectively coordinates and uses resource mobilization to implement action plans and achieve desired results.	Allocates resources to contribute overall performance for achieving the Centre's goals and objectives
Key Competency: 4.1.2. Team Spirit			
Behavior Indicator: 4.1.1.2 Demonstrates the ability to work in a team for a task to achieve the desired goal.			
Entry	Intermediate	Experienced	Advanced
Shows the attitude of a good team player and assists the seniors while performing the tasks.	Shows the characteristics of a good team leader to lead the team in carrying out tasks.	Shows the ability to mentor and guide the team leaders for efficient performance of the tasks.	Shows the ability to guide and judge the overall task.

2.7 Training Needs Analysis

The Training Needs is the difference between desired capability and current capability. The Training Needs Analysis is the process of recognizing the skills gap and needs of training. It is the procedure to determine whether the training will bring out a solution to the problem. It ensures that training is targeting the correct competencies, the correct employees and the needs of the Department. Training can reduce, if not eliminate, the gap by equipping the Hydro/met Officer with knowledge and skills. It should be the shared responsibility of the employee and the organization to build and enhance their capability and competency.

The training needs analysis is carried out in consultation with the stakeholders through interview, survey and FGD. The questionnaire consists of both closed and open-ended questions. The questionnaire is based on 11 behavioral indicators of different proficiency levels on Likert Scale of “Competent” and “Not Competent” followed by open ended questions asking the likely reasons for ‘Not Competent’ and suggest interventions to address the gap. The behavioral indicators were assessed by proficiency level to identify the performance gaps.

2.7.1 Training Needs Assessment at Entry Proficiency Level

Key Role: Hydro/met Expert				
Key Competencies	Description of Proficiency Level	Performance (C/NC)	Likely reason for performance gap	Capacity Development Intervention
1.1.1 Domain Expert	Basic technical knowledge on hydromet science and technologies.	Not Competent	-Different educational background	On-job training Mentoring Orientation Short ex-country training Internship in international organizations
	Assist senior colleagues in carrying out assigned tasks.	Not Competent	Inexperienced	Mentoring On-job training
1.1.2 Analytical skills	Able to perform task to resolve problems with directives from senior officials	Not Competent	Inexperienced	Mentoring On-job training Internship
	Demonstrate basic knowledge on understanding the systems	Not Competent	Lack of technical knowledge and experience	On-job training Mentoring Workshop Short term training
Key Role: Hydro/met network and Observation manager				

Key Competencies	Description of Proficiency Level	Performance (competent/Not competent)	Likely reason for performance gap	Capacity Development Intervention
2.1.1 Engineering skill (Communication and electronics, ICT, Infrastructure, remote sensing, GIS, satellite)	Understand the basic principle of hydro-met network systems and assist in monitoring and maintaining of hydro-met network systems.	Not Competent	Lack practical and technical knowledge and not familiar with the rules and regulation	On-job training Mentoring Orientation Short ex-country training Internship in international organizations
2.1.2 Training and Mentoring	Understand the concept of the hydromet network and assist in conducting the training.	Competent		
Key Role: Hydro/met data and Information Manager				
Key Competencies	Description of Proficiency Level	Performance (competent/Not competent)	Likely reason for performance gap	Capacity Development Intervention
3.1.1 Data analysis	Oversee that the screened data up to standard.	Not Competent	Lack of knowledge on WMO data standards.	Short ex-country training workshop Seminar
	Comprehends and interprets data for efficient data usage	Not Competent	Lack basic statistical knowledge	Short ex-country training workshop Seminar
3.1.2 Research and development	Understands basic research methodologies	Not Competent	No prior knowledge and experience in research techniques.	Short ex-country training workshop On-job training
Key Role: Common				

Key Competencies	Description of Proficiency Level	Performance (competent/Not competent)	Likely reason for performance gap	Capacity Development Intervention
4.1.1 Management	Understands and utilizes resource requirements adhering to centre's goals and objectives.	Not Competent	No prior management experience	Mentoring On-job training
	Shows the attitude of a good team player and assists the seniors while performing the tasks.	Competent		

2.7.2 Training Needs Assessment at Intermediate Proficiency Level

Key Role: Hydro/met Expert				
Key Competencies	Description of Proficiency Level	Performance (C/NC)	Likely reason for performance gap	Capacity Development Intervention
1.1.1 Domain Expert	In-depth and up to date knowledge on hydro-met science and technologies.	Not Competent	Lack of practical and technical knowledge due to inexperience and new advancing technologies.	On-job training Mentoring Long term training (Ex-country) Internship in international organizations
	Take leads in carrying out assigned tasks.	Competent		
1.1.2 Analytical skills	Demonstrate the ability to identify the problems.	Not Competent	Not enough knowledge and experience of working with the systems.	On-job training Mentoring Short ex-country training Collaboration with international organization

	Apply knowledge on analyzing the systems	Not Competent	Lack of knowledge on emerging systems	Workshop Seminars Webinars Conference Short-term training
Key Role: Hydro/met network and Observation manager				
Key Competencies	Description of Proficiency Level	Performance (competent/Not competent)	Likely reason for performance gap	Capacity Development Intervention
2.1.1 Engineering skill (Communication and electronics, ICT, Infrastructure, remote sensing, GIS, satellite)	Takes lead in monitoring and maintaining of hydro-met network systems	Not Competent	Lack of knowledge and experience on emerging systems	Short ex-country training Long term ex-country training workshop Seminar
2.1.2 Training and Mentoring	Plan and lead the training program	Competent		
Key Role: Hydro/met data and Information Manager				
Key Competencies	Description of Proficiency Level	Performance (competent/Not competent)	Likely reason for performance gap	Capacity Development Intervention
3.1.1 Data analysis	Always recommends and provides directives to improve the quality of data.	Not Competent	Lack the knowledge in data standards used by the WMO. Lack knowledge in the data standards used by the WMO.	Short ex-country training workshop Seminar
	Comprehends, interprets and produce appropriate analysis methods for efficient data usage	Not Competent	Lack of required skills and knowledge on data quality & management	Short ex-country training workshop Seminar

3.1.2 Research and development	Identifies potential research issues and conduct thematic studies	Not Competent	Lack of research skills	Short ex-country training workshop On-job training
Key Role: Common				
Key Competencies	Description of Proficiency Level	Performance (competent/Not competent)	Likely reason for performance gap	Capacity Development Intervention
4.1.1 Management	Effectively assesses and uses resources required to implement action plans and achieve desired results.	Not Competent	Inexperience	Mentoring On-job training
	Shows the characteristics of a good team leader to lead the team in carrying out tasks.	Competent		

2.7.3 Training Needs Assessment at Experienced Proficiency Level

Key Role: Hydro/met Expert				
Key Competencies	Description of Proficiency Level	Performance (C/NC)	Likely reason for performance gap	Capacity Development Intervention
1.1.1 Domain Expert	In-depth and up to date knowledge on hydro-met technologies and systems. Skilled in specific technical areas.	Not Competent	-Lack of practical and technical knowledge due to inexperience and new advancing technologies.	On-job training Mentoring Long term training (Ex-country)
	Apply technical knowledge to plan the tasks and take lead in implementing the tasks.	Competent		

1.1.2 Analytical skills	Identifies the problems, provides innovative ideas and solution	Competent		
	Provide guidance to analyze the system	Not Competent	Lack of knowledge on emerging systems	Workshop Seminars Webinars Conference Short-term training
Key Role: Hydro/met network and Observation manager				
Key Competencies	Description of Proficiency Level	Performance (competent/Not competent)	Likely reason for performance gap	Capacity Development Intervention
2.1.1 Engineering skill (Communication and electronics, ICT, Infrastructure, remote sensing, GIS, satellite)	Review new and innovative hydro-met network systems and recommend the best suited systems. and maintaining hydro-met network systems.	Not Competent	Lack of knowledge and experience on emerging systems	Short ex-country training Long term ex-country training workshop Seminar
2.1.2 Training and Mentoring	Design the training modules	Not Competent	Lack of expertise in the international standard.	Short ex-country training
Key Role: Hydro/met data and Information Manager				
Key Competencies	Description of Proficiency Level	Performance (competent/Not competent)	Likely reason for performance gap	Capacity Development Intervention
3.1.1 Data analysis	Always recommends, provides directives and guidance to set new data standards to improve the quality of data.	Not Competent	Lack expertise, knowledge and guidance.	Short ex-country training workshop Seminar
	Guides, mentors and trains subordinates on advanced	Not Competent	Lack of required skills and knowledge on	Short ex-country training workshop

	analysis and interpretation techniques for efficient data usage.		data quality & management	Seminar
3.1.2 Research and development	Ensures integrity, accuracy, and completeness of research finding in compliance with best international research practices	Not Competent	Lack of refresher course to keep up with the advance research technique	Short ex-country training workshop On-job training
Key Role: Common				
Key Competencies	Description of Proficiency Level	Performance (competent/Not competent)	Likely reason for performance gap	Capacity Development Intervention
4.1.1 Management	Effectively coordinates and uses resource mobilization to implement action plans and achieve desired results.	Competent		
	Shows the ability to mentor and guide the team leaders for efficient performance of the tasks.	Competent		

2.7.4 Training Needs Assessment at Advanced Level

Key Role: Hydro/met Expert				
Key Competencies	Description of Proficiency Level	Performance (C/NC)	Likely reason for performance gap	Capacity Development Intervention
1.1.1 Domain Expert	Comprehensive knowledge and skills on hydro-met technologies and systems. Experts in specific technical areas.	Not Competent	Lack of practical and technical knowledge due to inexperience and new advancing technologies.	Mentoring Long term training (Ex-country) Short term training

	Monitor and provide guidance to juniors while carrying out the tasks.	Competent		
1.1.2 Analytical skills	Anticipates problems and utilizes a variety of methods to mitigate them	Not Competent	Lack of knowledge on emerging technologies and systems	Collaboration with international organization Short term training
	Actively participates with the team while analyzing the system.	Not Competent	Lack of knowledge on emerging systems	Workshop Seminars Webinars Conference Short-term training
Key Role: Hydro/met Network and Observation manager				
Key Competencies	Description of Proficiency Level	Performance (competent/Not competent)	Likely reason for performance gap	Capacity Development Intervention
2.1.1 Engineering skill (Communication and electronics, ICT, Infrastructure, remote sensing, GIS, satellite)	Provide guidance and directives on the use of best available hydro-met systems.	Not Competent	Lack of knowledge and experience on emerging systems	Short ex-country training Long term ex-country training workshop Seminar
2.1.2 Training and Mentoring	Review and guide in the development of the modules.	Competent		
Key Role: Hydro/met data and Information Manager				
Key Competencies	Description of Proficiency Level	Performance (competent/Not competent)	Likely reason for performance gap	Capacity Development Intervention

3.1.1 Data analysis	Review and guide in development of new standards to further improve quality of data. Keeps updated and shares knowledge on new development in global data standards.	Not Competent	Lack expertise and knowledge and guidance	Short ex-country training workshop Seminar
	Leads, provides and recommends innovative ideas and best analysis and interpretation methods for efficient data usage.	Not Competent	Lack of required skills and knowledge on data quality & management	Short ex-country training workshop Seminar
3.1.2 Research and development	Advises on the advanced research statistical modelling concept, and interprets and communicates research findings to policy makers	Not Competent	Lack of refresher courses to keep up with the advanced research technique.	Short ex-country training workshop On-job training

Key Role: Common

Key Competencies	Description of Proficiency Level	Performance (competent/Not competent)	Likely reason for performance gap	Capacity Development Intervention
4.1.1 Management	Allocates resources to contribute overall performance for achieving the centre's goals and objectives	Not Competent	Lack of implementation of coaching and mentoring to subordinates	Short-term training Mentoring
	Shows the ability to guide and judge the overall task.	Competent		

2.8 Proposed Short-term Program and Learning Objectives

The framework has highlighted the likely reasons for the gaps and interventions proposed above. In order to provide a capacity building program, the following are the expected learning objectives. The respective proficiency level officials will be able to achieve the objectives mentioned against each of the training

Entry Proficiency Level

Sl. #	Training/Intervention	Methods of Implementation	Learning Objectives
1	<p>Domain Knowledge (Specialization)</p> <p>1.1 <u>Hydrology</u></p> <ul style="list-style-type: none"> - Training on hydrological, hydrodynamic, modeling. - Training on flood and flow forecasting and early warning system - Flood Frequency Analysis and Hazard mapping <p>1.2 <u>Integrated Meteorology Training</u></p> <ul style="list-style-type: none"> - Training on physical and dynamic meteorology - Training on mesoscale, synoptic and micrometeorology - Training on Argo-meteorology - Training on applied meteorology and climatology - Telecommunications - Training on atmospheric, and climate modelling. - Training on weather forecasting <p>1.3 <u>Aviation Meteorology</u></p> <ul style="list-style-type: none"> - Introduction to Aviation meteorology - Basic course on Instruction Package-Aviation Meteorologist <p>1.4 <u>Integrated Cryosphere Training:</u></p> <ul style="list-style-type: none"> - Application of geophysical techniques for Cryosphere monitoring. - Glacial geomorphology and geotechnical techniques for glacial lake monitoring. - Snow monitoring and mapping techniques - Basic high-altitude safety and mountaineering skills - Glacio-hydrological modeling. <p>1.5 <u>Common for all the thematic area</u> Basic course on Hydrology, meteorology, cryosphere & Atmospheric science</p>	<p>1.Short term trainings at regional training centers, partner institutions & universities</p> <p>2. In-house training</p> <p>3.Internship and on job training with partner institutions (eg: WMO, RIMES, ICIMOD, IMD, JMA, KMA)</p> <p>4.Field attachment</p> <p>5. Refresher courses</p> <p>6. Certification courses</p>	<p>1.Improved understanding of hydrological and meteorological and climate sciences for in proved hydro-met services to obtain improved socio-economic benefits</p> <p>2.Enhanced skill s for generating quality hydro-met products and services for improved warning and services</p> <p>3. Provide demand driven, impact-based weather, climate and hydrological services</p> <p>4.Utilize emerging science and technology to improve accuracy, timeliness, and precision of forecasts and warnings</p> <p>5.Provide modern facilities and reliable, secure, and extensible infrastructure</p>

2	<p>Research and development</p> <ul style="list-style-type: none"> - research methodology - Data Analysis tools - Report writing - Publication 	Short/ basic courses in-house/in-country/ex-country	Understands basic research methods and development principles.
3	<p>Hydro-met systems & tools</p> <ol style="list-style-type: none"> 1. GIS and Remote sensing Training 2. Training on database management 3. Surveying and mapping 4. Training on satellite image technology and processing. 5. Basic introduction to ICT tools and technologies. 6. Basic training on instrumentation and calibration. 7. Aeronautical Meteorological Instruments Course 8. Intermediate Course on Upper Air Instruments 9. Intermediate Course on Doppler radar 	<ol style="list-style-type: none"> 1.Short term courses Short/ basic courses in-house/in-country/ex-country 2.Inhouse trainings (1week- 1month) 3.Internships and on job trainings at regional centers and partner institution (eg: WMO, RIMES, ICIMOD, IMD, JMA, KMA) 	Obtain a good theoretical understanding and practical application for analysis.

Intermediate Proficiency Level (P3)

Sl. #	Methods of Intervention/Training Requirement	Mode of implementation	Learning Objectives
1	<p>Domain Knowledge</p> <p>1.1 Hydrology</p> <ul style="list-style-type: none"> - Training on water resource assessment - Advance training on /Hydrological/ hydrodynamic modelling. - Dam Failure Concepts and Modeling <p>1.2 Meteorology</p> <ul style="list-style-type: none"> - Advance Training on Global Circulation models (GCMs) Numerical Weather Prediction - Training on long range forecasting (medium extended, seasonal and range forecasting) - Training on climate change projection, adaptation and downscaling/mitigation (dynamic and statistical) - Training on mountain and satellite meteorology 	<ol style="list-style-type: none"> 1. Short/ basic courses in-house/in-country/ex-country 2. Short/ basic courses in-house/in-country/ex-country 3.Internship and on job training partner institutions (Example: WMO, RIMES, ICIMOD, IMD, JMA, KMA) 4.Field attachment 5. Refresher courses 6. Certification courses 	<ol style="list-style-type: none"> 1. Advance scientific knowledge and adopt technologies to improve and expand forecasting and early warnings 2. Deliver timely, high-quality weather, climate water and cryosphere-related services.

	<ul style="list-style-type: none"> - Training on geo-statistics and spatiotemporal modelling - Training on probabilistic and ensemble forecasting <p>1.3 Aviation Meteorology</p> <ul style="list-style-type: none"> - Advanced training on aviation forecasting. - Training on TARF/Sigmet forecasting <p>1.4 Cryosphere</p> <ul style="list-style-type: none"> - Advance training on glacio/Hydrological/hydrodynamic modelling. - Advance training on the application of geophysical techniques for Cryosphere monitoring - Advance training on glacial geomorphology and geotechnical techniques for glacial lake monitoring. - Advance training on snow monitoring and mapping <p>1.5 Common for all the thematic area</p> <ul style="list-style-type: none"> - Training on Impact based Forecasting and Extreme events and warning 		
3	<p><u>Hydro-met systems & tools</u></p> <ol style="list-style-type: none"> 1. Advanced training on remote sensing GIS 2. Advanced course on system development and hydro-met applications 3. Advance training on satellite image technology and processing. 4. Advance training on instrumentation and calibration. 5. Training on AI & ML for effective service delivery 	<ol style="list-style-type: none"> 1. Short/ basic courses in-house/in-country/ex-country 2. Internships and on job trainings at regional centers and partner institution (e.g.: WMO, RIMES, ICIMOD, IMD, JMA, KMA) 	<ol style="list-style-type: none"> 1. Use GIS and remote sensing analyses to address applied problems. 2. Effective planning and implementation of the hydro-met system.
4	<p><u>Leadership and Management</u></p> <ol style="list-style-type: none"> 1. Project Management 2. Effective communication (verbal/non-verbal) 3. Media management 	<ol style="list-style-type: none"> 1. Short/ basic courses in-house/in-country/ex-country 2. Short/ basic courses in-house/in-country/ex-country 	<ol style="list-style-type: none"> 1. Successful development of the project's procedures of initiation, planning, execution, and regulation

Experienced Proficiency Level (P2)			
Sl. #	Methods of Intervention/Training Requirement		Learning Objectives
1	<p>Domain Knowledge</p> <p>1.1 Hydrology</p> <ul style="list-style-type: none"> - Training on Flood risk assessment, Early Warning Systems and planning. - Training on disaster risk reduction and climate change vulnerability assessment. <p>1.2 Meteorology</p> <ul style="list-style-type: none"> - Training on Climate risk management and climate Impact Assessment - Training on Climate change policies and economics - Training on advanced modeling - Advanced training on Spatio-temporal modeling <p>1.3 Aviation Meteorology</p> <ul style="list-style-type: none"> - Aviation Weather Risk Management - Safety Oversight of Aviation Meteorological Services - Safety Management Systems Implementation and Integrated Safety Management System - ISO certified training on Quality Management System Requirements (QMS) - ISO certified training on Environmental Management System Requirements (EMS) - ISO certified training on Occupational Health and Safety Management System Requirements (OHSMS) - ISO certified training on Information Security Management Systems Requirements (ISMS) <p>1.4 Cryosphere:</p> <ul style="list-style-type: none"> - Advance courses on energy balance over snow and ice. - Courses on net water balance 	<ol style="list-style-type: none"> 1. Short/ basic courses in-house/in-country/ex-country 2. In-house training (1 week-1 month) 3. Seminar, workshop and conferences 4. Certification courses 	<ol style="list-style-type: none"> 1. Strengthen use of hydromet information and improve forecast skill to meet accuracy and confidence thresholds required for informed decision-making and risk management. 2. Equip with the capacity to develop user specific products and services 3. Understand how to use and interpret a standard set of different hydromet data sources and consider how to integrate it into development planning.

	<ul style="list-style-type: none"> - Integrated course on glacier mass balance, glacier remote sensing and melt modelling. <p>1.5 Common on all the Thematic Area</p> <ul style="list-style-type: none"> - Training on the use of Global hydrometeorological products and services, downscaling skills and verification of the model. 		
2	<p>Research and development</p> <ol style="list-style-type: none"> 1. Training on research publications 2. Training on Project proposal writing. 	<ol style="list-style-type: none"> 1. Short/ basic courses in-house/in-country/ex-country 2. Seminar, workshop and conferences 	<ol style="list-style-type: none"> 3. Independently undertake research 4. 5. Guide project operations to meet all agreed-upon objectives within the scope, schedule, quality, and budget constraints
3	<p>Leadership and Management</p> <ol style="list-style-type: none"> 1. Strategic Planning 2. Training on information management 	<ol style="list-style-type: none"> 1. Short/ basic courses in-house/in-country/ex-country. 2. In-house training (1week-1 month) 3. Seminar, workshop and conferences 	<ol style="list-style-type: none"> 1. Equip with the latest leadership skills, insight and tools to enhance leadership effectiveness and organizational performance.
Advanced Proficiency Level (P1)			
Sl. #	Methods of Intervention/Training Requirement		Learning Objectives
1	<p>Domain Knowledge</p> <ol style="list-style-type: none"> 3. Training on Quality Management Framework (QMF) 4. Training on framework for global and national hydro-met services 5. Training on Climate policy and economics 6. Training on hydro-met policies and standards 7. Effective planning, monitoring and management of hydro-met networks. 	<p>Short/ basic courses in-house/in-country/ex-country</p> <p>Seminars, workshops and conferences</p>	<ol style="list-style-type: none"> 8. Enhance knowledge and skills of technical and managerial employees 9. Understand the need to identify the relevance of standard policy, programme, plan or project.
2	<p>Research and development</p> <ol style="list-style-type: none"> 1. Project proposal writing and scientific publications 2. Peer reviewed publications 	<ol style="list-style-type: none"> 1. Short/ basic courses in-house/in-country/ex-country 2. Seminars, workshops and conferences 	<ol style="list-style-type: none"> 1. Equip with skills required for efficient and effective proposal writing, research

			methodologies and paper publication.
3	<p><u>Leadership and Management</u></p> <ol style="list-style-type: none"> 1. Change management. 2. Training on Leadership and governance 3. Training on financial management and Human Resources Development/Management 4. International relations and cooperation 	<ol style="list-style-type: none"> 1. Short courses in-house/in-country/ex-country 2. Seminars, workshops and conferences 	<ol style="list-style-type: none"> 1. Equip with the latest leadership skills, insight and tools to enhance leadership effectiveness and organizational performance.

Other mandatory trainings/certification/ workshop/seminars/meetings/

<ol style="list-style-type: none"> 1 COP meetings 2 IPCC 3 ICAO 4 WMO 5 UNFCCC 	<p>Trainings/certification/ workshop/seminars/meetings</p>	<p>NCHM being the focal point of IPCC and WMO in Bhutan, these are the training/certification/workshop/seminars/meetings that the Center has to attend periodically irrespective of knowledge/technical gaps.</p>
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2.9 Proposed Long-term Program (Specialization)

Long term Program (Masters)
Masters in Atmospheric and climate Sciences (Applied Meteorology/Climate Change/Numerical Weather Prediction/Climatology and Applied Climatology/ Aviation meteorology and Aviation management/ Tropical meteorology.)
Masters in Hydrology/Sediment/Water resource assessment
Masters in Cryosphere sciences (Glaciology/Geophysics/Glacial geomorphology/Geo-Tech)
Masters in Hydro informatics/Geoinformatics/Earth Observation and Remote Sensing/GIS/Geo-statistics/ Information systems.
Masters in electronics and communication/ Instrumentation engineering/technology and calibration
Masters in Earth Sciences

PhDs in relevant fields (No funds committed, however, based on the availability of the scholarship or funding support it will be allowed to pursue with study leave since it is highly technical and critical requirement).

2.10 Implementation of Competency based Framework

The implementation of training and other intervention has to be based on the mandatory **program/interventions** listed under section under the training needs analysis (Section 2.8) of this document. The mandatory list of training/intervention includes all the programs against the behavior indicators that are found to be “Not Competent” under the Training Needs Analysis. However, for implementation, it has to be prioritized based on the following:

- a. Annual prioritization
- b. Most critical area of intervention
- c. Rationalization of selection of participants
- d. Availability of resource allocation

Implementation has to be initiated and spearheaded by the concerned department or parent agency in close coordination and collaboration with the respective HR Division.

3. Recommendations

The following recommendations are proposed for the effective and efficient implementation of the CBF for Hydro/Met officers:

- CBF should be periodically reviewed and updated as and when required based on changing needs of the organization.
- RCSC is recommended to consider the Technical Key Competencies during the open competition appointment and lateral transfer
- RCSC is recommended to support budget provision for capacity-building as per CBF recommendations through RGoB, GoI and other donor agencies.
- Need for succession planning for Hydro/Met officers considering the technical nature of the subject matter and works.
- The management to endorse all the capacity building programs based on relevancy, priority, frequency and needs.
- Center to develop a specific Competency Frameworks for National Meteorological and Hydrological Services in Bhutan based on WMO Technical regulations and guidelines to guide the NCHM towards strengthening the capacity development and standard for effective delivery of hydro-met services, which will includes: Competency framework for Public Weather services (PWS), Competency framework for climate services delivery; Competency framework for hydrological and flood warning services; Competency for Aeronautical meteorological services; Competency framework for installation, operation of observation network; Competency framework for cryosphere monitoring and services

4. Conclusion

The National Center for Hydrology and Meteorology envisions to be a Center of excellence in Hydrology, Meteorology and Cryosphere Science and Services and competency of its employees remain as one of the core values in delivering timely services to relevant stakeholders and the public in general. Organizational success depends on clarity of role and capabilities of the employees who are engaged in delivering the Center's goals.

In view of the above it is equally important that we collaborate and invest resources in building capacities of the employees in pursuit of providing quality services to the nation. Therefore, the Competency based framework for Hydro/Met Officers was compiled and drafted over a period of three months. The Competency-based Framework identified 3 Key roles, 4 Competency Areas, 7 Key Competencies and 11 Behavior Indicators for Hydro/ Met Officer under four proficiency levels (P4 to P1). Through this CBF, performance gaps were identified based on training need analysis and accordingly various classroom training, both in-country and ex-country, different types of internships, on job training and long-term training were also identified and proposed. The implementation of Competency-based Framework for the Hydro/Met Officers will contribute towards enhancing overall efficiency both at individual and organizational level.

ANNEXURE I

List of task Force member

Sl.no	Name	Designation	Division
1	Sonam Lhamo	Exe.Geologist	CSD, NCHM
2	Ugyen Chophel	Sr. Statistical Officer	WCSD, NCHM
3	Yeshe Choki	Hydro/met Officer	HWRSD, NCHM
4	Sonam Choki	Hydro/met Officer	HOID, NCHM

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