



**NATIONAL CENTER FOR HYDROLOGY AND METEOROLOGY
COVID-19
CONTINUING SERVICE DELIVERY (CSD) PLAN
(Version 1:00)**

**NATIONAL CENTER FOR HYDROLOGY AND METEOROLOGY
ROYAL GOVERNMENT OF BHUTAN
THIMPHU: BHUTAN
MARCH 2020**

Acronyms

12 FYP	Twelfth Five Year Plan
AWLS	Automatic Water Level Station
AWS	Automatic Weather Station
CSD	Continuing Service Delivery
CSD	Cryosphere Services Division
DDM	Department of Disaster Management
EWS	Early Warning System
FMCR	Flood Monitoring and Command Room
FWS	Flood Warning Section
GLOF	Glacier Lake Outburst Flood
GMOG	GLOF EWS Management and Overseeing Group
GoI	Government of India
HOID	Hydro-met Operation and Infrastructure Division
HQ	Head Quarter
HWRSD	Hydrology and Water Resources Services Division
ICT	Information Communication Technology
MoHCA	Ministry of Home and Cultural Affairs
NCHM	National Center for Hydrology and Meteorology
NWFWC	National Weather Flood and Warning Centre
OEM	Original Equipment Manufacturer
PHPA-I	Punatsangchhu Hydropower Project Authority- I
PHPA-II	Punatsangchhu Hydropower Project Authority- II
R&D	Research and Development
RCSC	Royal Civil Service Commission
RGoB	Royal Government of Bhutan
SOP	Standard Operating Procedure
UNDP	United Nation Development Programmed
WCSD	Weather and Climate Services Division
WFCR	Weather Forecasting and Command Room
WMO	World Meteorological Organization

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NCHM Continuing Service Delivery Plan

1 Background

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 the atmosphere, its interaction with cryosphere and water bodies, the weather and climate and distribution of the country's water resources. It is the nodal agency responsible for generation of information and delivery of products and services on weather, climate, cryosphere and water resources in Bhutan.

The Center has a critical role in service delivery during the emergencies and in the events of hydro-met hazards and disasters as:

- a. The National Disaster Management Authority (NDMA) has designated NCHM as the National Hydro-met Early Warning Service Provider (EWS) within Country in line with Section 108 of the Disaster Management Act of Bhutan 2013, ensuring clear and systematic early warning and notification to government agencies and vulnerable populations and of threatening hydrometeorological hazards, disaster situations in the country
- b. Bhutan Civil Aviation Authority (BCAA) has designated as the national Aeronautical Meteorological Service Provider (AMSP) within Bhutan for effective delivery of meteorological services for Air Navigation,

NCHM hosts the National Database (Repository) on meteorology, cryosphere, hydrology, and environment related information and data.

This Continuing Services Delivery Plan (CSD) for COVID-19 was prepared as per the directive of RCSC based on the Center's existing Standard Operating Procedures (SOP) for hydro-met services delivery including the disaster preparedness for weather and flood early warning during the emergency. CSD will be updated as and when required based on the situation and directives from the Government and RCSC and.

The Center Continuing Services Delivery Plan (CSD) for COVID-19 (*Version 1.00 dated 28 March, 2020*) was reviewed and approved during the 67th Human Resources Committee (HRC) meeting of the Center held on 28th March 2020.

2 Agency Services Coordination Team (ASCT)

Based on the guidelines provided by RCSC, the NCHM has constituted the Agency Services Coordination Team (ASCT) with the following responsibilities:

- a. Overall coordination of NCHM services during COVID 19 lock down;
- b. Review and validate the categorization of services;
- c. Provide overall guidance and direction for effective delivery of services during the emergency;
- d. Review and approve the emergency procurements;
- e. Allocate resources and manpower based on the needs during emergency;
- f. Spearhead all activities that ensure the delivery of critical services of the Agency.
- g. Draw-up a business continuity plan that:

- Ensure the provision of essential services to the public during the emergency such as the COVID-19 outbreak continues;
 - Work towards stimulus and recovery plans of the Government; and
 - Provide for the safety and support for all its employees in the Agency.
- h. Responsible for all communication responsibilities
 - i. Review complaints and announce/publish on the website and other communication platforms for the information of the general public.
 - j. Work to provide reassurance and confidence amongst their employees
 - k. Collect all the contact details of the employees
 - l. Set-up communication platforms using social apps like WhatsApp for easier, faster and reliable communication.
 - m. Develop and implement a staff rotation roster for physical presence of staff and also limiting exposure of key staff to reduce risks of them being unavailable at the same time.
 - n. Rationalize services that could be provided remotely and give task-based assignments with proper accountability
 - o. Rationalize government properties like computers to support those that require urgent assignments to be delivered from home.
 - p. Ensure to provide sufficient sanitization of the work-place for the safety of those delivering physical presence service delivery.
 - q. Coordinate with law enforcing Agencies shall ensure to provide travel pass to the employees from home to work-place in the event it is required.
 - r. Ensure that mechanisms are put in place to protect all Government properties.
 - s. Carry out any other task given by the Government and RCSC related to managing the COVID-19 situation.

Table 1: NCHM ASCT

Sl. No.	Name	Role	Responsibilities	Contact Address (Mobile/Email)
1	Mr. Karma Dupchu, Director,	Team Leader	Oversee and provide direction for effective service delivery, Provide reassurance and confidence amongst employees	17629918 kdupchu@nchm.gov.bt
2	Mr. Karma, Specialist	Dy. Team Leader	Oversee and provide direction for effective service delivery; Provide reassurance and confidence amongst employees	17602050 karma@nchm.gov.bt
3	Mr. Singay Dorji, Chief, Weather and Climate Services	Member	Coordinate delivery of weather and climate services; Provide reassurance and confidence amongst their employees	17709253 sdorji@nchm.gov.bt
4	Mr. Tayba Buddha Tamang, Chief, Hydrology and Water Resources (HWRSD)	Member	Coordinate delivery of hydrological and flood/GLOF warning services; Provide reassurance and confidence amongst their employees	17666639 tbtamang@nchm.gov.bt
5	Mr. Pashu Pati Sharma, Offtg. Chief/Principal Engineer	Member	Coordinate effective monitoring, collection and transmission of hydro-met	17548945 ppsharma@nchm.gov.bt

			data for effective weather and climate, hydrological and flood/GLOF warning services; Provide reassurance and confidence amongst their employees	
6	Ms. Chhimi Wangmo, Dy. Chief Finance Officer (DCFO)	Member	Effective delivery of administration and financial services	17584184 cwangmo@nchm.gov.bt
7	Ms. Ugyen Tshomo, Human Resources Officer	Member	Effective Human Resources Management; Collect all the contact details of the employees, Facilitate communication with RCSC	17674693 utshomo@nchm.gov.bt
8	Mr. Shacha Chap, Program Officer	Member Secretary	Overall coordination and facilitation; Complaint Management Officer; Facilitate communication with relevant authorities for issues of PASS for movement of staff and vehicles, MTO	17740541 schap@nchm.gov.bt

3 Technical Coordination Team

Considering the technical nature of the job and specialized skills and knowledge required for deliver critical services during the emergency, the following two Technical Coordination Teams are constituted for the Center.

3.1 Weather Services Coordination Team (WSCT)

The Weather Services Coordination Team (WSCT) is constituted within the NCHM with following members to coordinate and oversee the effective delivery of weather services. WSCT team will provide overall guidance and technical backstopping services remotely and at the sites based on the needs for the 24/7 operation of the Weather Forecasting Center Room (WFCR) of the National Weather and Flood Warning Center (NWFWC), HQ, Thimphu. The WSCT team will report to ASCT.

Table 2: Weather Services Coordination Team

Sl. No.	Name	Role	Responsibilities	Contact Address (Mobile/Email)
1	Mr. Singay Dorji, Chief, Weather and Climate Services	Team Leader	Oversee and coordinate delivery of weather and climate services	17709253 sdorji@nchm.gov.bt
2	Mr. Tshencho Dorji, Dy. Executive Engineer	Dy. Team Leader	Technical backstopping	77292379 tshenchod@nchm.gov.bt
3	Mr. Sonam Rabten, Sr. Hydromet Officer	Member	Coordination, monitoring for timely delivery of aviation weather services	17576162 srabten@nchm.gov.bt
4	Mr. Kuenzang Dorji, ICT Officer	Member	Technical backstopping for ICT system	17691407 kdorji@nchm.gov.bt
5	Mr. Jangchup Choephyel Dorji, Hydro Met Officer	Member	Coordination with Site staff	17887396 jcdorji@nchm.gov.bt

6	Ms. Pema Syldon, Met Hydro Officer	Member Secretary	Coordination, monitoring for timely delivery of weather and climate services	17332909 psyldon@nchm.gov.bt
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Strategy for WSCT:

- a. Team members to provide technical backstopping and services from home.
- b. Based on the physical presence required, a relevant team member shall visit the office to facilitate service delivery as and when required and during the emergency.
- c. Center to facilitate pick and drop by pool vehicle, if a private car is not permitted to ply on road during the emergency

3.2 Flood Warning Services Coordination Team (FWSCT)

Similarly, the Flood Warning Services Coordination Team (FWSCT) is constituted within the NCHM with following members to coordinate and oversee effective delivery of flood/GLOF early warning services during the emergency. FWSCT team will provide the overall guidance and technical backstopping services remotely and on sites/office based on the needs for 24/7 operation of the Flood Monitoring and Command Room (FMCM) of the National Weather and Flood Warning Center (NFWFC), HQ, Thimphu. FWSCT team will report to ASCT.

Table 3: Flood Warning Services Coordination Team

Sl. No.	Name	Role	Responsibilities	Contact Address (Mobile/Email)
1	Mr. Tayba Buddha Tamang, Chief, HWRSD	Team Leader	Oversee and coordinate delivery of hydrology and GLOF EWS services	17666639 tbtamang@nchm.gov.bt
2	Mr. Phuntsho Tshering, Exe. Geologist	Dy. Team Leader	Technical backstopping	17319947 ptshering@nchm.gov.bt
3	Mr. Tandin Wangchuk Dy. Exe. Engineer	Member	Coordination and oversee monitoring for delivery of flood/GLOF EWS	17563060 tandinw@nchm.gov.bt
4	Mr. Trashi Namgyal, Dy. Exe. Engineer, HOID	Member	Coordinate with regional office and site offices	17492942 tnamgyal@nchm.gov.bt
5	Mr. Kunzang, AE, FWS, HOID	Member	Technical backstopping communication	17699141 kuenzang@nchm.gov.bt
6	Mr. Kuenzang Dorji, ICT	Member	Technical backstopping for ICT system	17691407 kdorji@nchm.gov.bt
7	Mr. Sangay Tenzin	Member Secretary	Coordination and oversee monitoring for delivery of flood/GLOF EWS	17711753 sangaytenzin@nchm.gov.bt

Strategy for FWSCT:

- a. *Team members to provide technical backstopping and services from home.*
- b. *Based on the physical presence required, a relevant team member shall visit the office to facilitate service delivery as and when required and during the emergency.*
- c. *Center to facilitate pick and drop by pool vehicle, if a private car is not permitted to ply on road during the emergency.*

4 Types of Services

NCHM as the technical and scientific agency is responsible for generation of information and delivery of products and services on weather, climate, cryosphere and water resources in Bhutan. Continuous monitoring and data collection from more than 250 hydro-met stations (Manual + automatic) has to be continued. Flood/GLOF warning stations have to be monitored 24 hours during the monsoon. The National Weather and Flood Warning Center (NWFWC) in Thimphu (HQ) and GLOF Early Warning System (EWS) Control Room of Wangdi (Punatsangchhu), Tongsa (Mangdechhu) and Kurjey, Bumthang (Chamkarchhu) have to be operated 24/7 to deliver 24 hours services.

Hydro-met Services of NCHM are categorized into three types as discussed below:

4.1 Critical services requiring physical presence

- a. 24/7 Operation of National Weather and Flood Warning Center (NWFWC) at Thimphu;
- b. 24/7 Operation of GLOF EWS Control room Punatsangchhu basin at Wangdi;
- c. 24/7 Operation of GLOF EWS Control room Mangdechhu basin at Trongsa;
- d. 24/7 Operation of GLOF EWS Control room Chamkarchhu basin at Kurjey, Bumthang;
- e. Aviation meteorological and weather for air navigation;
- f. Hydro-met data collection and transmission from hydromet network stations covering the whole Bhutan and
- g. Sediment Sample Collection and Analysis in Laboratory

Detail services requiring the physical presence are given in Annexure-I.

Brief write up of each services and proposed strategy are discussed below:

4.1.1 24/7 Operation of National Weather and Flood Warning Center

The National Weather and Flood Warning Center (NWFWC) in Thimphu is the supervisory and command centre for NCHM for monitoring and dissemination of hydromet services and products. The NWFWC is equipped with state-of-the-art ICT equipment linked with Global Telecommunication System (GTS) and satellite receiving facilities that facilitate monitoring of extreme weather and flood/GLOF. NWFWC is linked with the National Emergency Operation Center (NEOC) operated by the Department of Disaster Management (DDM), MoHCA.

The NWFWC is operated by technical staff on 24/7 on shift basis. NWFWC has two main offices:

a. Weather Forecasting Center Room (WFCR):

WFCR is responsible for monitoring weather and producing weather forecasts. Daily weather forecasts and extreme weather advisories are prepared and issued by WFCR. It is also responsible for receiving and uploading meteorological data to the Global Telecommunication System (GTS) of the World Meteorological Organization (WMO) 2 times in 24 hours. A minimum of 2 technical staff is required to be physically present in WFCR for monitoring, preparing and issuing daily weather forecasts, issuing extreme weather advisories and special services to sectors based on needs. These services are more critical during the monsoon. The following technical staff of Weather and Climate Services is required to be physically working in WFCR to deliver the weather services on shift basis (2 staff on 8 hours shift).

Table 4: Staff list of Weather Forecasting Center Room, NWFWC, Thimphu

Sl. No.	Name	Designation	Mobile No.	Email address
1	WFCR Office Contact /Hotline	02-339673/02-335578/77452632		wfcr@nchm.gov.bt
2	Mr. Karma Tenzin	Hydromet Technician	17617926	karmatenzin@nchm.gov.bt
3	Mr. Ranjit Tamang	Hydromet Technician	17858241	Mr. rtamang@nchm.gov.bt
4	Mr. Phurba	Hydromet Technician	17615337	phurba@nchm.gov.bt
5	Mr. Sonam Tashi	Hydromet Technician	77634940	sonamtashi@nchm.gov.bt
6	Mr. Tshering Peljor	Hydromet Technician	77634558	tpeljor@nchm.gov.bt
7	Mr. Tshering Wangchuk	Hydromet Technician	17634176	tsheringwangchuk@nchm.gov.bt
8	Mr. Pema Dorji	Hydromet Technician	17517925	pemadorji@nchm.gov.bt

Strategy for WFCR, NWFWC:

- a. *Since the physical presence of Technical Staff will be required for 24/7 operation of NWFWC, it is requested to designate them as emergency personnel category to provide mobility from their home to NWFWC as per their shift roster.*
- b. *A necessary PASS from the concerned authority will necessary for their mobility during the emergency.*
- c. *Center to facilitate pick and drop by pool vehicle, if a private car is not permitted to ply on road during the emergency.*
- d. *Restrict public and unauthorized people to visit the WFCR, NWFWC with immediate effect;*
- e. *Center to provide necessary consumable cleaning kits, soap and sanitizers to maintain cleanness and hygiene of NWFWC and washrooms*
- f. *Provide necessary gears such as masks, gloves based on the need as per the Ministry of Health recommendations.*

[In case of complete lockdown, a dedicated team authorized by Center will operate the FMCR, NWFWC where they will be stationed in the NWFWC. The essentials food items with cooking facilities and accommodation shall be arranged and provided by the Center. MoEA Day Center (ground floor) of NWFWC building will be used as accommodation]

b. Flood Monitoring and Command Room (FMCR)

FMCR is responsible for monitoring the floods and GLOF EWS. Daily river level status and flood advisories are prepared and issued by FMRC. FMCR is also responsible for collection of hourly data from all the hydrological stations during the monsoon season for monitoring and warning. A minimum of 2 technical staff has to be physically present in FMRC for monitoring, preparing and issuing flood warnings and advisories during the extreme weather/flood events. This GLOF monitoring is more critical during the monsoon season due to the rise in air temperature and most of the rainfall happens during this season. The following technical staff of FMCR of the Hydrology and Water Resources Services Division, NCHM will be physically working in NWFWC to deliver the flood and GLOF EWS services on shift basis (2 staff on 8 hours shift).

Table 5: Staff list of Flood Monitoring and Command Room, NWFWC, Thimphu

Sl. No.	Name	Designation	Mobile No.	Email address
	FMCR Office Contact/Hotline	02-338442/17128052		fmcr@nchm.gov.bt
1	Mr. Jigme Wangdi	Hydromet Technician	17628951	jzangpo51@gmail.com
2	Mr. Pema Dorji	Hydromet Technician	17980717	pemadorji613@gmail.com
3	Mr. Wangdi	Hydromet Technician	17588639	wangdi8117@gmail.com
4	Mr. Aita Singh Tamang	Hydromet Technician	77396048	aitasingh1993@gmail.com
5	Mr. Sangay Wangmo	Hydromet Technician	17474707	wangmos74@gmail.com

Strategy for FMRC, NWFWC:

- a. *Since the physical presence of Technical Staff will be required for 24/7 operation of NWFWC, it is requested to designate them as emergency personnel category to provide mobility from their home to NWFWC as per their shift roster.*
- b. *A necessary PASS from the concerned authority will necessary for their mobility during the emergency.*
- c. *Center to facilitate pick and drop by pool vehicle, if a private car is not permitted to ply on road during the emergency.*
- d. *Restrict public and unauthorized people to visit the FMRC, NWFWC with immediate effect;*
- e. *Center to provide necessary consumable cleaning kits, soap and sanitizers to maintain cleanness and hygiene of NWFWC and washrooms*
- f. *Provide necessary gears such as masks, gloves based on the need as per the Ministry of Health recommendations.*

[In case of complete lockdown, a dedicated team authorized by Center will operate the FMCR, NWFWC where they will be stationed in the NWFWC. The essentials food items with cooking facilities and accommodation shall be arranged and provided by the Center. MoEA Day Center (ground floor) of NWFWC building will be used as accommodation]

4.1.2 24/7 Operation of GLOF EWS Control room in River basin

NCHM has installed and operating the Glacier Lake Outburst (GLOF) Early Warning Systems on Punatsangchhu, Mangdechhu and Chamkharchhu, where most of potentially dangerous lakes located in the head water. Each basin has a GLOF EWS Control Room equipped with ICT facilities to monitoring weather and flood in real time including the activation of sirens. GLOF EWS Control Room is located at Wangdi for Punatsangchhu basin, Trongsa (MHPA Dam colony) for Mangdechhu and Kurjey (Bumthang) for Chamkharchhu. It is monitored and operated 24/7 by regular staff on shift for delivery warning services during the GLOF events. The following staff are engaged for 24/7 operation of GLOF EWS Control Room.

Table 6: Staff of GLOF EWS Control Room at Wangdue

Sl. No.	Name	Phone No.	Mobile No	Email
	Control Room, Wangdi Office Number	02-481369/17126175		glofewsinfo@gmail.com
1	Mr. Purna Kumar Poudel	Technician (In-charge)	17669575	purnakumarpoudel@gmail.com
2	Mr.Sangay Tshering	Technician	17693263	stshering1979@gmail.com
3	Mr. Dawa Yangchen	Technician	17617030	yangchendawa2010@gmail.com
4	Mr. Sonam Tashi	Technician	17773801	Sonamtashi770@gmail.com
5	Mr. Tshering Choden	Technician	17994926	Chodentshering366@gmail.com
6	Mr. Pempa Dorji	Technician	17979381	semmukda23@gmail.com

Table 7: Staff list of GLOF EWS Control Room, MHPA Colony, Trongsa

Sl. No.	Name	Phone No.	Mobile No.	Email
	Control Room Office, Trongsa, Contact Number	03-521618/17128053		glofewstrongsa@gmail.com
1	Ms. Sangay Choden	Technician (In-charge)	17468703	Sangaychoden2nchm@gmail.com
2	Mr. Sangay Norbu	Technician	17633898	Sangaynorbu514@gmail.com
3	Mr, Kinzang Chopel	Technician	17967249	kinhofel@gmail.com
4	Ms. Chimi Pema	Technician	17598682	Cpema1982@gmail.com

Table 8: Staff of GLOF EWS Control Room at Kurjey, Bumthang

Sl. No.	Name	Phone No.	Mobile No.	Email
	Control Room, Kurjey Contact Number	03-631963/17128054		glofewsbumthang@gmail.com

1	Mr. Dungchu Wangdi	Technician (In-charge)	17707103	Dungchuwangdi596@gmail.com
2	Mr. Ugyen Thinley	Technician	17731750	ugyenthinley.nchm@gmail.com
3	Mr. Ugyen Dorji	Technician	17597545	ud@education.gov.bt
4	Ms. Yangchen Lhamo	Technician	17572065	Yanglhamo2019@gmail.com
5	Mr. Tashi Tenzin	Technician	17733676	
6	Mr. Sonam Lhamo	Technician	17716229	Sonam.ljinp505@gmail.com

Strategy GLOF EWS Control Room:

- Physical presence of Technical Staff will be required for 24/7 monitoring and operation GLOF EWS Control during the emergency. However, since most of the staff are staying in the staff quarters near the GLOF EWS Control Room, it is proposed to continue functioning as per the normal shift system with precautionary as advised by the Ministry of Health.*
- Center restrict public and unauthorized people visiting the Control Rooms,*
- Center to provide necessary consumable cleaning kits, soap and sanitizers to maintain cleanness and hygiene of Control Rooms and washrooms.*
- Center to provide necessary gears such as masks, gloves based on the need as per the Ministry of Health recommendations.*

4.1.3 Aviation meteorological Services for Air Navigation

NCHM is the Aeronautical Meteorological Service Provider (AMSP) within Bhutan for effective delivery of meteorological services for Air Navigation. Aviation Meteorology Office (AMO) is located within the Air Traffic Services (ATF) building inside the Paro International Airport. Aviation Met Office is co-located with the Air Traffic Control room of all the three domestic airports. AMO is required to provide updated weather information to ATS Staff for communication with airline pilots before departure and on arrival of all the airports.

AMO at Paro international airport and Domestic airport are equipped with weather monitoring and communication systems. The physical presence of staff is required for monitoring, preparing the Meteorological Aerodrome Routine Reports to the Air Traffic Service based on the flight schedule. The following Staff of the Aviation Met Office will be required to present at their office in the airport on shift based on flight operation during the emergency.

Table 9: Aviation Meteorology Office Staff at Paro International Airport

Sl. No.	Name	Designation	Mobile No.	Email address
	Aviation Met Office Contact number, Paro Airport	02-323703 /335578/ 17576162		
1	Mr. Tshering Nima	Sr. Technician	17632535	tnima@nchm.gov.bt
2	Mr. Tashi Gyeltshen	Technician	17879652	tgyaltshen@nchm.gov.bt

3	Ms, Sonam Lhamo	Technician	17602863	sonamlhamo@nchm.gov.bt
4	Ms. Pem Dem	Technician	17522121	pdem@nchm.gov.bt
5	Ms. Puspa Katwal	Technician	17643110	pkatwal@nchm.gov.bt

Table 10: Aviation Meteorology Office Staff at Bumthang Domestic Airport

Sl. No.	Name	Designation	Mobile No.	Email address
1	Ms. Koksel Dema	Technician	17702497	kdema@nchm.gov.bt
2	Ms. Kuenzang Lhadom	Technician	17279628	klhadon@nchm.gov.bt

Table 11: Aviation Meteorology Office Staff at Gelephu Domestic Airport

Sl. No.	Name	Designation	Mobile No.	Email address
1	Ms. Manisha Tamang	Technician	17825767	mtamang@nchm.gov.bt
2	Mr. Namgay Wangchuk	Technician	17811347	nwangchuk@nchm.gov.bt

Table 12: Aviation Meteorology Office Staff at Yonphula Domestic Airport

Sl. No.	Name	Designation	Mobile No.	Email address
1	Ms. Tshering Choden	Technician	17882837	tchoden@nchm.gov.bt
2	Ms. Sonam Choden	Technician	17485664	schoden@nchm.gov.bt

Strategy for Aviation Met Office, Airports:

- a. Since the physical presence of above Technical Staff will be required at airport office based on the flight operation, it is proposed to designate them as emergency personnel category to provide mobility from their home to office as per shift system;*
- b. Center restrict public and unauthorized people visiting the office,*
- c. Center to provide necessary consumable cleaning kits, soap and sanitizers to maintain cleanness and hygiene of Control Rooms and washrooms.*
- d. Center to provide necessary gears such as masks, gloves based on the need as per the Ministry of Health recommendations.*

4.1.4 Hydro-met Data Collection and Transmission (Site Office)

NCHM has more than 250 hydro-met stations (Manual + Automatic) covering the whole Bhutan. More than 100 regular staff (Technicians) are responsible for data collection and transmission to the National Weather and Flood Warning Center (NWFWC), HQ Thimphu for data archival as well as for weather and flood forecasting. During the summer the Hydrological and Flood Warning stations have to collect river level data on an hourly basis. The Flood Warning Station (33 sites) have to transmit data HQ and Indian States of Assam and West Bengal as per the data transmission schedule. Therefore, the physical presence of staff at the sites is necessary for data collection and transmission to maintain data continuity.

Strategy for Hydro-met Data Collection and Transmission (Site Offices)

- a. *The physical presence of above technicians will be required at all the manual hydro-met stations for data collection and transmission even during the emergency for weather and flood warning services delivery and to maintain data continuity.*
- b. *Since most hydro-met monitoring stations are located in the isolated remote areas and staff are staying in the government quarters near the stations it is proposed all the site staff to continue routine functions with precautionary measures as advised by the Ministry of Health.*

4.1.5 Sediment Sample Collection and Analysis in Laboratory

Sediment samples are collected daily by the site staff from the Sediment sampling stations of Pachhu, Thimphu and Wangchu every after 20 days to Thimphu Sediment Lab for analysis. There are two lab assistants who carry out daily sediment sample analysis in the laboratory. As per the technical requirement the samples collected from the sites have to be complete lab analysis before 20 days. In order to maintain data continuity samples collection and lab analysis have to be continued. The physical presence of technical staff at the sediment lab is required for sample analysis to maintain data integrity during the emergency as well as collocation of samples from the field.

Table 13: Sediment Lab Assistant, Thimphu

Sl. No.	Name	Designation	Mobile No.	Email address
1	Ms. Renuka Kumari Thapa	Lab Assistant	17668211	thaparenu973@gmail.com
2	Ms. Sonam Zangmo	Lab Assistant	17389193	szangmo@nchm.gov.bt

Strategy Sediment Lab operation, Thimphu

- a. *The physical presence of above technicians will be required at Sediment lab during the for sediment sample analysis to maintain data continuity. It is proposed to designate them as emergency personnel category and request for necessary PASS for their mobility from their home to Office to perform the work.*
- b. *Center to facilitate pick and drop by pool vehicle, if a private car is not permitted to ply during the emergency.*
- c. *Center to provide necessary consumable cleaning kits, soap and sanitizers to maintain cleanness and hygiene of Control Rooms and washrooms.*

4.2 Delivery of Essential and Routine Services Home and/or Remote

4.2.1 Full Delivery of Services from Home/Remote working

Most of the Administration, Finance, Human Resources management support and planning services can be delivered from home or remote working such as:

- a. Human resource management and development services including HRC meeting and approvals EXCEPT trainings, recruitment and selection
- b. Administrative and financial matter
- c. Programs and Planning (APT Monitoring, input into the GPMS)

4.2.2 Partial Delivery of Services from Home/Remote Working

The following technical services and products can be delivered via partially from home and/or remote working:

- a. Seasonal forecast (Summer and Winter)
- b. Monthly climate summary
- c. Extended Range Prediction
- d. Annual climate summary
- e. Technical report on weather and climate
- f. Climate projection information and data based on request
- g. Flood Modelling and forecasting
- h. Data Processing and analysis (monthly flow and dissemination)
- i. Report writing

4.2.3 Partial Delivery of Services visiting office

1. ICT Officer

Most of the data of Weather and Hydrology are transmitted automatically across the country. An ICT Officer is the member of two technical team has to provide onsite and the technical backstopping of the ICT system as per the needs and during the emergencies. Also facilitate online services delivery with updates of websites and other requirement.

2. Office Sweeper

The National Weather and Flood Warning Center has to operate 24/7 and it's reflected in the critical services during lockdown.

Details of the NCHM services that can be provided through remote working is given in the Annexure-II.

Strategy Sediment Lab operation, Thimphu

- a. Based on the urgency and needs of the hydro-met services delivery such as data/information and reports by the sectors, limited office working by some technical officer may be allowed.*
- b. In the event of Server or System error ICT officer and related technical staff will visit the office to resolve the issues.*
- c. Sweeper has to come to the office particularly at the National Weather and Flood Warning Center (NFWWC) once a week to clean the office and keep hygiene.*

4.3 Services that can be deferred

Most of planned activities for the FY 2019-2020 are in the advanced stage of implementation like construction and procurement of plants and equipment. However, completion of construction works and delivery of goods may be delayed due to COVID-19 international lockdown.

The following planned activities and services can be deferred:

- a. HRM activities like Recruitment and selection
- b. HRD activities like Ex-country and in-country travels (trainings/meetings/seminars, etc..)

5 Distribution of Staff by Working mode

The list of employees by category type based on working mode is given in the table.

Table 14: List of Staff by Working Mode

Staff Category	Directorate/ Secretariat	CSD	WCSD	HWRSD	HOID	Total
a. Physical Present in the office	1		16	5	22	46
b. Partially Working remotely	1	2	5	5	100	112
c. Fully Working remotely	11	4	9	2		25
d. Staying at home (Pregnant, sick etc.)			2	0		2
Total	13	6	32	12	122	183

6 Annexure

The following are annexures prepared as per the RCSC guidelines and submitted to RCSC.

- 6.1** Annexure I: NCHM Critical Services that requires physical presence
- 6.2** Annexure II: NCHM services that can be provided through remote working
- 6.3** Annexure II: NCHM Services that can be deferred

Annexure –I: NCHM Critical Services that requires physical presence

Division/Section	Services	Nos. of Staff Involved	Remarks
Weather and Climate Services	a. 8 hourly weather updates b. Daily weather forecasts c. Daily weather analysis report d. Special Weather Forecast based on request from users	7	The National Weather and Flood Warning Center (NWFWC), Thimphu is operational 24/7 to prepare weather products and services which are disseminated to stakeholders, TV, Radio, print media, NCHM website and social media. Therefore, physical presence is required to monitor and analyse the weather systems and produce the weather products and services.
	Extreme Weather Advisories	2	Physical presence is required at NWFWC to monitor and analyse the weather systems to prepare and issue weather extreme weather advisories during extreme weather events.
	Climate information services	2	Physical presence is required to operate Climate Database Management System for data processing and dissemination of climatological data to users.
Aviation meteorological services	Meteorological Aerodrome Reports (METAR/SPECI) - Weather briefing and consultation	11	The physical presence of an observer is required for monitoring, preparing and disseminating Meteorological Aerodrome Reports (METAR/SPECI). Prepare and disseminate Weather briefing and consultation with the flight dispatch office.
Hydrology and Water Resource Services	Flood Monitoring and Command Room, NWFWC, Thimphu	5	The physical presence of staff is required on the shift for 24/7 monitoring and operation of FMCR, NWFWC, Thimphu. Overall monitoring of the EWS for Punatsangchu, Mangdechu and Chamkharchu basin
	GLOF EWS advisories and warning	2	In the case of GLOF event, NCHM follows the SOP for monitoring and dissemination of information. As per the SOP the relevant officers has to be present in the Office for further discussion and information dissemination
Secretariat Services	Internet connection	1	Internet connection and keeping systems up and running is critical for all NCHM employees to provide individual Division's services.
	System and Application Monitoring	1	
	Sweeper	1	In order to keep the NWFWC clean, sweeper must visit once a week to clean and dump waste.
Hydromet Operation and	Real time Data Receive and monitor and communicating with important stations	2	

Infrastructure Division	FWS Wireless Operator for real time data receiving and passing on to Indian counterparts	2	
	Control Room at Wangdue, Mangdechu, Chamkhar Chu to remain operational	9 (3 from each CR)	GLOF/rainstorm flood EWS are installed in three river basins; Punatsangchu, Mangdechu and Chamkharchu. The physical presence of staff on shifts are required for 24/7 monitoring and operation of the GLOF EWS Control Rooms
	FWS sites Kurichu, Dorokha, Chazam, Pangzam, Shershong and Pangbang to remain Operational	12 (2 from each sites)	24 hours monitoring is required for data transmission to India (Assam and West Bengal) and HQ as per the routine scheduled
	Lunana and Thanza Flood Warning Office to remain operational	4 (2 from each place)	Physical monitoring of lakes and GLOF EWS backup
	Dodeyna Flood Warning Station on Wangchhu to remain operational	1	Physical monitoring and data transmission of flood to Lingkana Palace
	Sediment Sample Collection and Analysis in Laboratory	2	Sediment samples are collected daily by the site staff from the Sediment sampling stations of Pachhu, Thimphu and Wangchu every after 20 days to Thimphu Sediment Lab for analysis. There are two lab assistants who carry out daily sediment sample analysis in the laboratory.

Annexure – II: NCHM services that can be provided through remote working

Division/Section	Services	Nos. of Staff	Remarks
Weather and Climate Services (WCSD)	Seasonal forecast (Summer and Winter)	1	NCHM annually prepares and disseminates seasonal forecasts for summer monsoon outlook (June, July, August, September) and winter monsoon outlook (December, January, February). This can be performed remotely from the office by telecommunicating with colleagues to produce the output.
	Monthly climate summary	1	NCHM prepares and disseminates climate summary monthly. This can be performed remotely from the office by telecommunicating with colleagues to produce the output.
	Extended Range Prediction	1	NCHM prepares and disseminates extended range prediction every week. This can be performed remotely from the office by telecommunicating with colleagues to produce the output.
	Annual climate summary	4	NCHM prepares and disseminates climate summary annually. This can be performed remotely from the office by telecommunicating with colleagues to produce the output.
	Various reports on weather and climate	18	Reports can be prepared remotely from office and disseminated through internet
	Climate Projection information based on request	1	NCHM prepares and shares climate projection information. This can be performed remotely from the office by telecommunicating with colleagues to produce the output.
Hydrology and Water Resource Services	Flood Forecasting and warning	2	The model products for flood forecasting is available via the internet, flood forecasting can be prepared from remote. In case of extreme flood forecast, officials have to be present in the FMCR, NWFWC for issuance of forecast warnings.
	Monthly flow monitoring and dissemination	2	The monthly flow monitoring can be prepared and updated on the website via the internet.
	Dissemination of historical data based on the users request	2	Since most of the request for data are made via email, the data dissemination can be done via email as per the user request
HRS, Secretariat	All human resource management and development services including HRC meeting and approvals EXCEPT trainings, recruitment and selection	3	Any HR approvals can be sought through online from the HRC members. HR issues/matters/proposals can be discussed and deliberate vide email, by using G suites and sharing scanned copies. HR online system (CSIS) is accessible from anywhere. Any office orders can be printed, signed and scanned from home
Administration and Finance Section, Secretariat	All financial matter	2	Services can be provided online (e-pems & myrb) with internet connection and scanned papers
	Administrative Services	1	Any urgent management issues can be discussed online; email, official WeChat group, and WhatsApp group.
	Programs and Planning (APT Monitoring, input into the GPMS)	1	

Annexure- III: NCHM Services that can be deferred

Division/Section	Service	No Staff	Remarks
HRS, Secretariat	Recruitment and selection	3	Any recruitment and selection can be withheld for time being. Heads involved can be applicants, panel members in addition to HR staffs
	Ex-country and in-country travels (trainings/meetings/seminars, etc..)	3	As advised by the Government, any training, meetings, seminars and workshops (Ex/In-country) can be withheld for time being on priority basis. The party involved will be all the employees under NCHM who would be attending the trainings/seminars/workshops and the organizers