

## Terms of Reference

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# **TRAINING ON AGROMETEOROLOGY**

(Contract ID No: PPCR/DHM/S/IND -73)

May 2019



## **1. Background**

The objective of the BRCH project is to enhance government capacity to mitigate climate related hazards by improving accuracy and timeliness of weather and flood forecasts and warnings for climate vulnerable communities, as well as developing Agricultural Management Information System (AMIS) services, administered by the Ministry of Agriculture and Livestock Development (MoALD), to help farmers mitigate climate related production risks. The project comprises four components:

- A. Institutional strengthening, capacity building and implementation support of DHM;
- B. Modernization of observation networks and forecasting;
- C. Enhancement of the service delivery system of DHM; and
- D. Creation of an agriculture management information system (AMIS).

Component A aims to develop and/or strengthen DHM's legal and regulatory frameworks, improve institutional performance as the main provider of weather, climate and hydrological information for the nation, build capacity of personnel and management, ensure operability of the future networks, and support project implementation. Component B aims to modernize DHM observation networks, communication and ICT systems, improve hydro meteorological numerical prediction systems and refurbish DHM offices and facilities. Similarly, Component C aims to enhance the service delivery system of DHM by creating a public weather service that provides weather and forecasts impact, and information services for climate-vulnerable communities and the key weather dependent sectors. Component D will provide critical and timely agro-climate and weather information as well as agro-advisories to farmers in order to increase productivity and reduce losses from meteorological and hydrological hazards.

## **2. Introduction**

Agricultural productivity is strongly dependent on water resources and climatic conditions, especially in regions of the world which are particularly sensitive to climatic hazards. On these regions (e. g. Nepal) the importance of Agrometeorological services is emphasized due to changing climate and increasing climate variability, increasing population and changes in modes of agricultural practices. The demand for more accurate agrometeorological information and services is increasing with development of farming systems and patterns, such as water management and weather-based pest and disease control. Agrometeorological forecasts, such as severe weather warnings, climate outlooks, related advisories and contingency plans, need to be more localized and tailored and to reach the farmers even at remote locations.

Enhanced agrometeorological services are being developed in the BRCH project through establishing automatic weather stations and providing more localized weather forecasts representative of each agricultural district in Nepal. Altogether 29 automated weather stations are being installed and equipped with instruments such as pyranometers, soil temperature and moisture probes, sun shine duration and ground water level sensors. These allow generation of a set of agrometeorological variables and indices to help farmers to estimate e.g. correct timing and amount of irrigation and to protect plants from frost. In addition, analyses of key climatic variables such as onset, length, and cessation of growing season can be calculated based on both observed and forecast weather data.

- Length of cold spells and heat spells during the growing season
- Number of frost days, cold days, hot days
- Length of dry spells defined by applying drought indices
- Number of dry and heavy precipitation days during growing season
- Return periods of extreme and devastating weather and climatic events

Secondly, the on-going growing season conditions are followed-up and agrometeorological weekly or 10-day bulletins are to be published. These bulletins include relevant climate data and information about the development of growing season, e.g., summarizing accumulated precipitation and evaporation and an estimate about the soil moisture conditions. In addition there is an evident need to assess future conditions. In shorter time span forecasts the agrometeorological service shall provide 1-2 day and weekly forecasts, but also sub-seasonal to seasonal forecasts available from the global producing centres for long-range forecasts are needed for the planning of agricultural activities.

This Terms of Reference (ToR) is for a Trainer (here after Consultant) to conduct training course on Agrometeorology.

### **3. Objective of the Assignment**

The objective of the training course is to provide the trainees with a solid knowledge about Agrometeorological information; agrometeorological observations, derived variables and indices and how to issue agrometeorological forecasts and warnings. Trainees will learn how to interpret agrometeorological data and to further process it to a form useable by agricultural advisors.

### **4. Scope of Work**

#### **4.1 Training topics**

The training topics are here listed as a guideline for the candidate to prepare a detailed agenda and time line for the course:

- Agrometeorological instruments and observations,

- Calculation of agrometeorological variables and indices
- Working with and Interpreting agrometeorological data; e.g. statistical analysis and extreme value analysis
- Basics on modelling of crop microclimate and crop growth
- Agrometeorological forecasting and service, downscaling of seasonal forecasts, probabilistic forecasting products,
- Applications of remote sensing in agriculture
- Agrometeorological warnings; response advisories for farmers,
- Climate change & variability and its impact on agriculture
- Agrometeorological products for major crops
- Prepare Standard Operational Procedures (SOPs) for using agrometeorological derived products/weather and climate information for issuing agromet advisories/warnings to farmers/policy makers.

## **4.2 Practical arrangements**

The estimated maximum number of trainees is about 20, with 10 persons in two groups. Training should be conducted twice- 5 days for each group, making 10 training days. Four additional workdays are reserved for course and report preparation, totalling of 14 workdays for the completion of the training (as in table below).

<b>Preparation and reporting</b>	<b>Training-Group 1 (max 10trainees)</b>	<b>Training-Group 2 (max 10 trainees)</b>
4 days	5 day	5 day

The training will be conducted at DHM, Kathmandu. The Consultant shall plan the training course so that all listed topics are covered with sufficient detail and completed during the allocated 5 training days.

Observation data for this training as well as the NWP data and the workstations shall be available during the training. However, in case of unavailability of such data, the Trainer (Consultant) shall arrange access to or bring adequate set of observation and forecast data to be used during the training. ***Trainer (Consultant) should communicate with DHM in advance to ensure the availability of the data.***

Training courses are normally held on official working days (between Sunday and Friday), from 10 a.m. until 16 p.m. Lunch break is between 13:00-and 13:45. The Consultant shall provide list of requirements for the training facility and equipment in advance<sup>1</sup>.

The anticipated timing of training is July 2019.

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<sup>1</sup> *These are preliminary specifications used to facilitate the trainer selection process and to prepare the preliminary/final plan for the training course. The length of training, adaptation of content, number of participating staff and practical arrangements may need to be finalized at contract signing*

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## **5. Reporting requirements, Time-line and deliverables**

The Consultant shall submit a detailed training plan and a Final report as follows. Both reports shall be submitted in 3 hard copies along with corresponding e-copies. These two reports are subject to approval by DHM.

### **5.1 Detailed Training plan: one week before agreed start date of training**

The detailed Training Plan must include but not limited to objectives of training, detailed list contents of the training course, proposed schedule, daily agenda's, training methods used, required arrangements for training regarding the training facility, computing resources and equipment in detail, required qualification of participants to attend the course, learning targets which comply with the international requirements quoted above, evaluation methods and scoring.

### **5.2 Final Report: Report on results of Training: Due after two weeks of completion of the training**

The Final Report shall be submitted within two weeks after completion of the training. The training report shall cover all training material (Submitted in the Annex) in printed (3 copies) and digital form including ***appropriate demonstrative video files covering complete course***. The report shall consist of basic information of the courses (list of participants, daily agendas etc.), summary of course evaluations based on questionnaire submitted to the participants, and results on learning i.e. assessment of the competencies and skills acquired by the participants.

All training material shall be submitted (listed as Attachments to the Final Report) in appropriate digital format(s) (e.g. .ppt, .doc, .pdf files) covering all the lectures (presentations) and demonstrations. The training material should include a comprehensive list of references to published literature that complement the content of the training.

## **6. Client's Commitments (Inputs)**

Staff of DHM/PMU will provide basic organizational support to the Consultant. At the request of the Consultant, DHM will provide following documents/ information:

- Information and data related to the project including information on status of observation networks, monitoring/lab equipment, communication, computing resources, and data processing tools;
- Project Appraisal Document (PAD), reports submitted by SI and other relevant publications;
- Other related documents as requested in support of activities.

- Training logical facilities
  - Training Hall
  - Projectors
  - Audio/Video recording (If necessary)
  - Stationeries
  - Refreshments/lunch
- Necessary transportation and other logistics for field visits (if any)

## **7. General Requirements of the Trainer (Consultant) on Agrometeorology (14 workdays)**

The Trainer (Consultant) should have provided training on the agrometeorological application (described above in chapter 4.1).

### **7.1 Qualifications for a Trainer (Consultant)**

The Trainer (Consultant) will be responsible for providing training on Agrometeorology taking into account the cultural context, climate of Nepal, changing organization structure of DHM and new tools and methods being developed through the BRCH project.

The Consultant must provide a CV, letter(s) of reference signed by clients and other relevant references, such as information of training courses held (year, name and length of the course, course feedback grade), as applicable for proof of the following qualifications:

#### **Qualifications:**

- A minimum of Bachelor's degree in a field related to the assignment (Meteorology, Agrometeorology/Agriculture) is required. Master's degree is considered as advantage.
- Evidence of having at least five (5) years of experience as an Agrometeorologist or Trainer in topics related to this assignment. Longer experience is considered as advantage.
- Letters of reference of holding at least three (3) training courses held on agrometeorology or closely related topics. More references and training courses held in international context, are considered as an advantage.
- Co-operation skills, as well as a flexible, innovative and solution-oriented approach to work, customer-orientated mentality and ability to use ICT tools.
- Strong command with English language is considered as an advantage

## **8. Payment schedule**

- 20 percent of contract value after approval by DHM on the Detailed Training Plan.
- 50 percent after completing all the training courses

- 30 percent of contract value after submission and acceptance of the Final report by DHM and SI.

## **9. Selection Criteria**

The consultant will be selected based on the individual consultant selection method of the World Bank's Guidelines on "Selection and Employment of Consultants, January-2011, revised on April, 2015". Main criteria for the selection will be relevant work experience and qualifications.