



IFMS Approach to Education and Training in Weather and Climate

Sushil Kumar Dash

Chair, IFMS Committee on Webinars & Training

Immediate Past President, Indian Meteorological Society

Formerly Professor & Head, CAS, IIT Delhi

IFMS E&T Initial Steps

- Capacity development based on existing knowledge and skills in Weather and Climate is one of the objectives of IFMS.
- E&T efforts of IFMS was initiated in **Boston AMS Annual Meeting, Jan 2020** with some invited talks and follow up discussion.
- Meeting between **Dr. Patrick Parrish, Chief, WMO Training Programme; COMET Director Dr. Elizabeth Page** and myself was held on 17 Feb 2020 in New Delhi.
- **Discussions in the IFMS Council has lead to a Survey of the current E&T activities of its member societies.**
- **Webinar by COMET Director Dr. Elizabeth Page** on 29th Jan 2020 which most of you joined.
- **Webinar on Global Campus Initiative (GCI) of WMO** by Dr. Patrick Parrish on February 17, 2021.
- After me you will hear from **Dr. Dr. Keith L. Seitter, AMS** and **Prof. Elizabeth Bentley, RMetS.**
- This is just the **Beginning** which will be followed by **Staying together (Progress) and Working together (Success)** (Ref: Henry Ford) with effective collaboration with international programmes such as COMET and GCI and among NMSoc.

IFMS Education and Training (E&T) Committee

IFMS is grateful to the following E&T Volunteer Experts



Prof. S.K Dash, Chair
E&T Committee
Retd. Director CAS-IIT



Mr. Ramesh Bhatia
Past President IMS &
Retd. DG-IMD



AVM Dr. AJR Tyagi
Past President IMS &
Retd. DG-IMD



Prof. Elizabeth Bentley
IFMS -Region 6 Rep.
CEO Royal Met Society



Dr. Harinder Ahluwalia
President IFMS



Mr. Michael Martens
IFMS -Region 5 Rep
President NzMS



Dr. Rattan Datta,
Director at MERIT
New Delhi



Dr. L. S. Rathore
Past President of IMS &
Retd. DG-IMD



Dr. Someshwar Das,
Director at MERIT
New Delhi



Mr. Narayan Gautam
Asst, Professor
Tribhuvan University, Nepal

IFMS Needs many more Volunteer Experts for E&T Committee. Please offer your service by sending an email to ifms.collaboration@gmail.com
Also Need Experts in Spanish, Portuguese, French and other languages

In addition to IFMS regular Committee on Webinars and Training consisting of some Council Members,

There is one E&T Committee consisting of some Council Members and Volunteers.

IFMS – Assisting in Capacity Building through Education and Training



**Prof. Sushil K. Dash, Dr. Harinder Ahlawalia, Mr. Rameesh C. Bhatia, Dr. Ajit Tyagi,
Dr. Ratan K. Datta, Prof. Someshwar Das and Asst. Prof. Narayan Gautam**

1. Introduction

Global Warming and Climate Change (GW&CC) are having serious effects on the weather patterns resulting in great loss of life, property and quality of life. All nations need to be fully prepared to handle all challenges resulting from the effects of GW&CC. As Covid19 has shown, unpreparedness for calamities, whether natural or man-made, can cause great disruption in life on top of loss of life and economic development. A very important part of preparedness is capacity building in all countries – especially in Developing and Least Developed countries - through Education and Training (E&T). World Meteorological Organisation (WMO) plays a very important role in the area of capacity building. However, due to the vastness of this task and limited resources, WMO can use assistance of other organizations such as IFMS, which can provide assistance through its member Societies.

Since climate change affects all sections of the society, all stake holders need to be educated adequately to understand the contribution of human beings to the climate change, take appropriate measures to adapt to the situation, make proper policies to safe guard the society, make adequate scientific progress to deliver early warnings, etc. Therefore, E&T related to climate change issues must not be limited to the professionals working in meteorology and students in educational institutions and researchers in research organisations. Appropriate E&T should also be imparted to the general public, school teachers and students, policy makers, administrators and stake holders in the fields of agriculture, human health, tourism, fishing industry, etc.

Almost all nations have their own meteorological agencies which regularly monitor weather and climate related data and forecast the weather at different time scales. These weather agencies train their employees regularly and WMO helps these weather men get adequate training in their respective organisations. WMO has also several Regional Training Centres (RTCs) set up for the benefit of cluster of nations. In the recent years, it has been felt that with the advancement of weather instruments and climate science, the training material and methods need to be upgraded appropriately. From that perspective, the Global Campus Initiative (GCI) has been born. The basic objective of this initiative is to impart state-of-the-art training to the meteorologists working in National Meteorological and Hydrological Services (NMHSs) in order to get them educated on the advancements in the weather and climate science and to get them prepared for the future demands of forecasting. GCI also encourages the RTCs to collaborate with other educational and research organisations, where member societies of IFMS can contribute significantly through the extension of outreach programmes.

Why IFMS?

- IFMS consists of several Met Societies as its members which are very active and have close collaboration with NHMSs, Educational institutions, Stake holders, Associations and NGOs involved with the people at large.
- Members of Met Societies include not only several existing employees of NHMSs but also senior members who have long experience in the field and have potential to train others. Thus Met Societies can undertake the job of training the Trainers which will eventually lead to Chain reactions. This will have multiplying effects.
- IFMS can contribute significantly to the centrality of COMET and WMO-GCI ie. Collaboration.
- IFMS will widen the scope of WMO-GCI by encompassing Outreach Programmes based on Citizens Science concept.
- IFMS with the help of Met Societies can contribute significantly in Climate Services where participation of the people is very important for last mile connectivity.
- IFMS can eventually contribute to the quality of training by modifying the existing course materials specific to the climate issues of different regions. Focus will be given on the regional languages and gender issues at the regional level.

Requirements of Collaboration, Volunteers and Funding

The success of this IFMS initiative very much depends on:

Collaborations with International Organisations and also among National Met Societies. (Learning and Sharing)

Formation of **Large Volunteers Group** and adequate support.

Involving Senior members from Met Socs is the best strategy.

(Providing facilities and ease at work)

Formation of **new Met Societies** and Regional Societies.

(Support of NMHServices)

Joint **PPA** platform. (Division of responsibilities)

Sl. No.	Important E&T Themes in Weather & Climate
1.	Teachers & Students Training
2.	Public Awareness of Weather & Climate Disasters
3.	Exposure to Numerical Weather Prediction
4.	Satellite Data Use
5.	Data Collection Instruments
6.	Processing and Display System

IFMS needs to be selective in its approach

- E&T in Meteorology is not new. Several educational institutions, NMHSs, R&D institutions, Met Societies and similar organisations are on the job for years.
- Different types of course materials are available either on free platforms or on payment basis.
- Under the present circumstances, investing time (also funds) on the use of scientific knowledge for the Public Good is paramount.
- IFMS should focus on Teachers & Students and Public Awareness.

Notable Sites in Weather and Climate

- (1) CALMet Moodle Course for Trainers and Educators**
- (2) MetEd**
- (3) GLOBE Weather**
- (4) UN CC:Learn**
- (5) UCSanDiago: Bending the Curve**
- (6) National Resource Centre on CC IISER Pune**
- (7) UNESCO Climate CC Education**
- (8) MetLink, RMetS**
- (9) AMS Education Program**

Teachers & Students Training

- Teachers are the backbone of any society. By training a teacher, one trains several others in the way of cascading effect. **There is hardly any climate science course at the school level in several Asian and African countries. Geography is the only subject taught at schools which covers some aspects of the climate.**
- Science of weather and climate is interdisciplinary in nature and it covers all important science subjects such as **physics, chemistry, mathematics and geography** is schools. These subjects can be taught in the context of weather and climate, once the teachers are exposed to short training programmes.
- Course materials can be compiled which will have **good exposure to basics of weather and climate science, the observational set up, mathematical models, climate change, weather extremes and related other issues.** Emphasis should be given on societal relevance.
- Experts can visit specific schools and give seminars so that students will be exposed to basics climate science and the challenges of climate changes. **Real time participation will benefit in education.** Sort of extracurricular activities. Examples are EcoClubs etc.
- Such efforts may encourage students to be innovative in combating the climate crisis.

Awareness programmes

- Considering the complexity of the climate change, its origin, uncertainties and tremendous adverse impacts on the society, it is of paramount importance that **various facets of climate science and climate change reach the people of all sectors in the society.**
- IFMS has a very responsible role **to take science to the society by organising various types of events.** There are several ways.
- Awareness about the **extreme weather events and related safety issues** can be explained to the people in batches.
- Human contribution to climate change can be explained to the people in simple local **languages by organising town hall seminars and also in schools and colleges.**
- Mostly, the meteorological community is involved with **World Meteorological Day, World Environmental Day, Ozone Day, Water Day and Oceans Day.** Several Met Societies across the world are observing these days to a limited extent.

Summary of IFMS Survey on E&T - 1

- 19 Met Societies have responded so far. Efforts are in progress so that more societies will join this survey.
- Although the number of NMSocs joining the survey is less than expected, the information gathered are very valuable and throws adequate light on the present status of the Met Societies. The membership strength of these societies vary from 125 to 12,000.
- The survey covered a wide range of items such as hosting meetings, seminars, conferences, availability of online resources, support to teachers and students, Certification or Accreditation in Meteorology, public engagement and outreach etc.
- It is important to note that E&T heavily depend on collaboration, PPA interactions and public availability of documents or best practices. This survey gives a very positive flavour for IFMS to make more efforts in strengthening its E&T programme.

Summary of IFMS Survey on E&T - 2

- **Almost all NMSocs feel that under the present circumstances, the role of NMSoc is very important for the public good, although couple of NMSoc strangely do not feel the need of any NMSoc. Almost all societies rely on volunteers to carry out their activities.**
- **Only 8 societies get partial financial support from their respective national governments and the rest completely depend on their membership fees and some other arranged sources to conduct annual activities.**
- **Collaboration, documentation and Public-Private-Academia (PPA) mode of action are important components of any society to achieve multiplying effects. The survey says that out of 19 societies, 12 collaborate with other NMSocs and other related organisations and feel that collaboration is fruitful.**

Summary of IFMS Survey on E&T - 3

- **Survey indicates that 11 societies organise meetings/events from time to time for different purposes, although sometimes one is held in conjunction with the other. Today, holding virtual meetings have become easy and almost free with the support of platforms like Zoom, WebEX, Microsoft Teams, Stream yard, Go to etc.**
- **Annual General Body (AGB) meetings are common to almost all NMSocs although 3 societies do not hold even those meetings.**
- **It is interesting to note that large number (8-10) of NMSocs deliver at least one training course annually. Four NMSocs offer more than 4 trainings a year although two societies organise 12 and 25 training events annually.**

Summary of IFMS Survey on E&T - 4

- **Certification or Accreditation facility is existing only in AMS, RMets and Canada.** Further, course programmes with details of the structure of training courses and topics covered are available only with AMS, RMets and SUMS. *It is important to note that although the number of NMSocs offering Certification or Accreditation facility is less, more (seven) NMSocs are interested to know more about these programmes.*
- **As many as 16 NMSocs organise conferences every year. Only 3 societies do not hold conferences.** *It is heartening to know that seven societies organise these events free of cost even if these are in-person events.*

Summary of IFMS Survey on E&T - 5

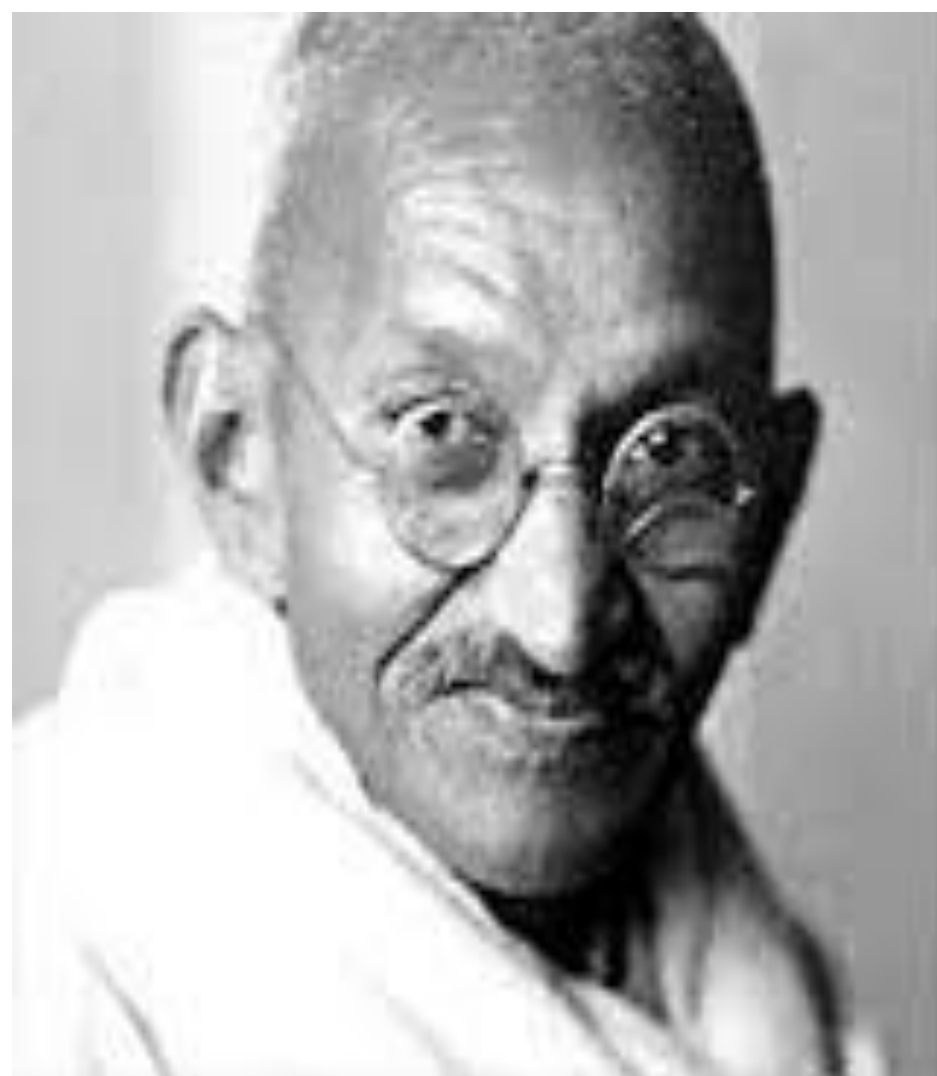
- Almost all NMSocs are in favour of holding more conferences, meetings and seminars if more support is available from external sources. **As a common answer to a specific question in the survey, it is noticed that they need IFMS support capacity building and public awareness related activities.**
- Training is complimentary to any teaching programme. Education helps in knowledge acquiring and training helps in developing the skill. **Survey of 19 NMSocs indicates that almost all societies are engaged in training of sort or the other. Some go for teaching regular courses in meteorology and others for professional development.** Even three societies teach meteorology courses in schools and colleges. Five societies provide training courses freely and three others make those available when required.

Summary of IFMS Survey on E&T - 6

- Basic objectives of NMSocs are to share knowledge on various topics related to weather and climate such as extremes, glacier melting, dry and wet spells, unusual weather etc. **These NMsocs expect IFMS to suggest them appropriate courses with availability of adequate support.** *Most of the societies have limited teachers and teaching resources. Majority of NMSocs expect IFMS to support them in capacity building and awareness activities by providing additional teaching materials.*
- Another important aspect of education is public engagement. **This survey indicates that 14 NMSocs are engaged with some other environment related societies in new work mode while five do not have any outreach programmes.** *It is necessary to improve understanding of weather and climate through public awareness programmes and IFMS will be able to help NMSocs in this regard.*

Suggestions for IFMS approach in E&T

- E&T is very essential but it needs persistent effort to get its impact on the society. **There should be short and long term goals in such an endeavor.**
- Based on the current survey conducted among IFMS member societies, one can infer that several societies are already engaged in Teachers & Students Training and Awareness Programmes on Climate Change. **These societies have clearly expressed their views for IFMS support to extend their existing programmes. Hence the above two should be the themes of IFMS E&T effort.**
- E&T programmes will be implemented by the NMSocs and hence their views may be taken in a virtual **Workshops/General Body Meetings.**
- IFMS should **identify the successful programmes of one society and help implementing those** in other societies in collaborative spirit.
- With the help of volunteers from member societies, **IFMS should identify suitable courses from selected sites and help NMSocs in executing those.**
- **IFMS (alongwith NMSocs) jointly with GCI, COMET and other such international initiatives shall achieve a great deal in expanding the scope of Outreach Programmes in Weather and Climate.**



“Without action,
you aren't going
anywhere.”

Mahatma Gandhi

*Seeking your valuable
suggestions,*

*Thank you for your kind
attention.*