Guide to the Management and Operation of WMO Regional Training Centres and Other Training Institutions

2017 edition

WEATHER CLIMATE WATER

WORLD METEOROLOGICAL ORGANIZATION

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FOREWORD

The Regional Meteorological Training Centres of the World Meteorological Organization (WMO), now referred to as Regional Training Centres (RTCs), were established within the first decade and a half of the creation of the Organization in order to bridge critical gaps in training facilities at regional level. For all intents and purposes, these centres, owned and run by the host countries in support of WMO training activities in the Regions, are designated on the recommendation of WMO regional associations upon meeting certain criteria set by the Organization. Since the 1960s, when the first set was inaugurated in Argentina (Buenos Aires), Kenya (Nairobi), Nigeria (Lagos), Costa Rica (San José) and Egypt (Cairo), RTCs have been established in other areas of the world and have satisfactorily trained thousands of students in the field of meteorology and allied disciplines.

Growing demand for a variety of training courses across geographic regions and the need to conduct training in various languages, has led to establishment of more RTCs in the past five decades. As the challenges faced by WMO Members and the entire international community continue to multiply, it is incumbent on WMO to ensure that the RTCs remain technically and politically able to meet the ever-evolving contemporary needs.

This publication responds to the recommendations made in the review of the future roles and operation of RTCs, which was carried out by the Executive Council Panel of Experts on Education and Training from 2012 to 2014. The review and recommendations were approved by the WMO Executive Council at its sixty-sixth session in 2014. The review underlined the importance and usefulness of the RTCs to WMO Members. However, it also noted that, for Members to get even more value from such centres, the criteria for designation and reconfirmation of RTCs needed to be improved and that Directors of RTCs would benefit from a handbook that brought the key information on running an RTC together in one publication. The handbook would also be of value to organizations that either use or are considering using RTCs to train their staff.

As the material included in this publication is also relevant to directors and senior managers in other training institutions associated with National Meteorological and Hydrological Services, the content was broadened a little and the title changed to reflect the wider audience. The material in this guide complements national and institutional standards and recommended practices, and provides a broad framework to enable RTCs and other training institutions to move from individual national institutions to a global network based upon common and shared practices.

On behalf of WMO, I seize this opportunity to express appreciation to the Members who have allocated additional resources in support of the work of the Organization as hosts of RTCs, and assure them of the unceasing support of WMO to the continued success of these Centres.

(Petteri Taalas)
Secretary-General

1. INTRODUCTION

1.1 PURPOSE OF THE GUIDE

The World Meteorological Organization (WMO) has established a network of Regional Training Centres (RTCs). This Guide is aimed at supporting the maintenance and development of the RTC network by providing operational guidance, explanations and examples of good practice. In particular, the Guide is intended to support RTCs by:

– Bringing together information about RTCs that is available in various WMO publications and reports;

– Providing new material that builds upon the current roles and operations of RTCs;

– Giving examples of good practice and successful initiatives at RTCs.

This Guide is not prescriptive about how RTCs should operate but does recommend policies and processes that are considered as good practice. The intention is to assist RTCs in developing, delivering, managing and evaluating their learning activities and getting increased benefit from promoting their activities and working in partnership with others.

For those unfamiliar with WMO, the following section provides an overview and links to further information on the Organization. The next two sections introduce the WMO Education and Training Programme (ETRP), which provides the context for the activities of RTCs; they identify the key bodies that oversee and shape the ETRP.

1.2 STRUCTURE, VISION, MISSION AND ACTIVITIES OF WMO

WMO is an intergovernmental organization and is the United Nations system's authoritative voice on the state and behaviour of the Earth's atmosphere, its interaction with the oceans, the climate it produces and the resulting distribution of water resources. At the time of writing, WMO represents 191 countries and territories – these are referred to as Members.

Permanent Representatives of Members with WMO are normally Directors of National Meteorological and Hydrological Services (NMHSs) who act on technical matters for their governments between sessions of Congress. Permanent Representatives are the normal channel of communication between WMO and Members and maintain contact with the competent governmental or non-governmental authorities on matters concerning the work of WMO. Permanent Representatives appoint, when appropriate, hydrological advisers representing respective National Hydrological Services, or equivalent national agency.

The two key WMO governing bodies are:

– Congress, which meets every four years and sets the direction, activities and budget for the following four-year period. For example, the Seventeenth World Meteorological Congress in May 2015 set the direction, activities and budget for the 2016 to 2019 financial period, which are linked to Programmes and Expected Results;

– The Executive Council, which is elected by Congress and meets annually to oversee the activities of the Organization between Congresses.

In addition, there are (a) six regional associations that coordinate meteorological, hydrological and related activities within their respective Regions, (b) eight technical commissions that study

meteorological and hydrological operational systems, applications and research, and (c) the Secretariat. More information about regional associations and technical commissions and how RTCs can collaborate with them is given in sections 5.4 and 5.5.

Figure 1.1 illustrates the relationship between these bodies and the Secretariat. For more information about the governance of WMO go to http://public.wmo.int/en/about-us/governance.

As well as the bodies included in Figure 1.1, there are also Regional Offices that coordinate with the various departments at WMO headquarters to implement resource mobilization, partnership building and advocacy-related activities in their Region (see http://public.wmo.int/en/our-mandate/how-we-do-it/regional-offices). Their remit includes liaising with regional institutions such as RTCs.

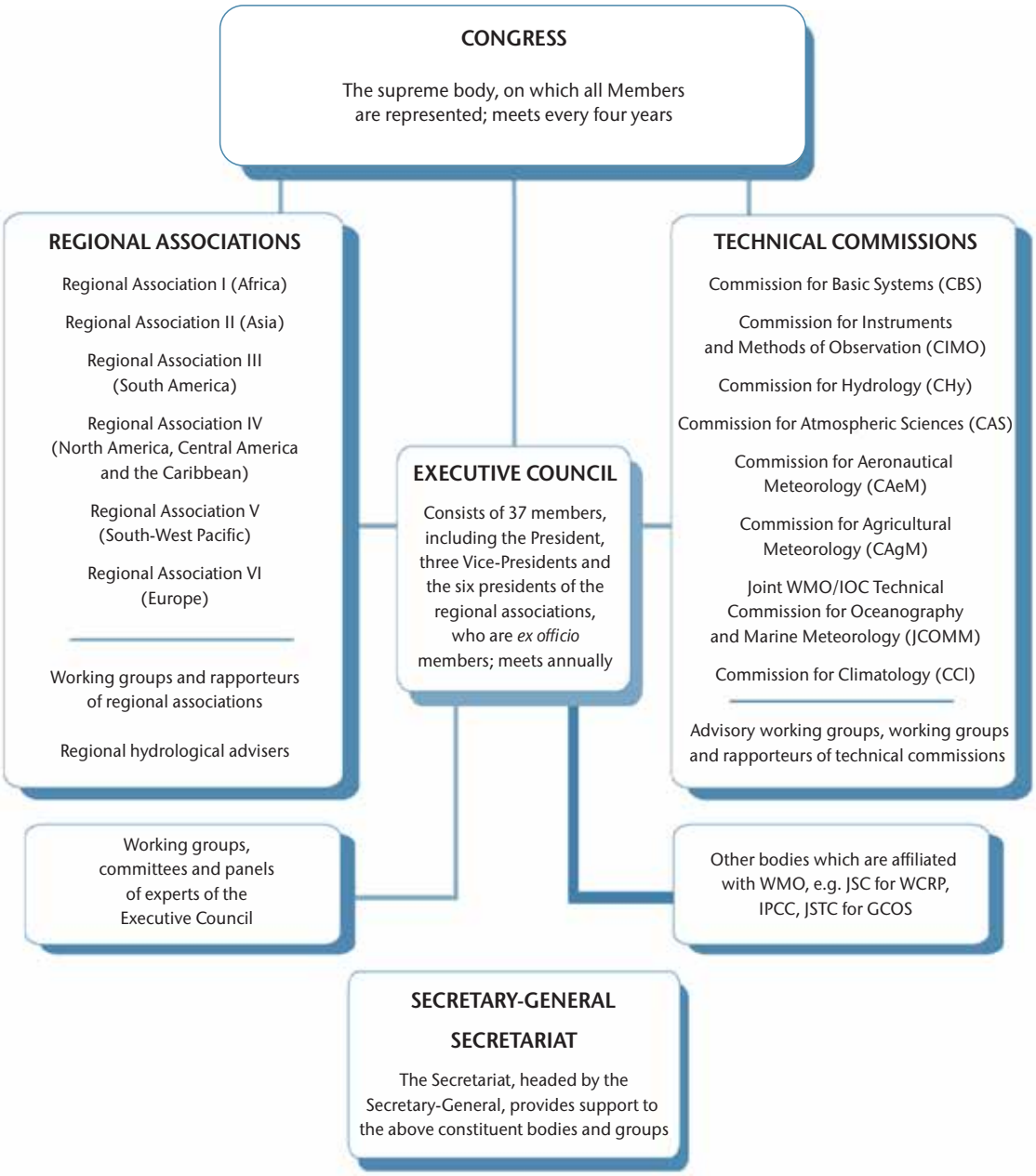


Figure 1.1. WMO constituent bodies

WMO carries out its work through scientific and technical programmes that are overseen by the WMO technical commissions and facilitated by various (technical) departments within the Secretariat.

WMO Programmes facilitate and promote:

- The establishment of networks of observational stations to provide weather, climate and water-related data;
- The establishment and maintenance of data management centres and telecommunication systems for the provision and rapid exchange of weather, climate and water-related data;
- The creation of standards for observation and monitoring in order to ensure adequate uniformity in the practices and procedures employed worldwide and, thereby, ascertain the homogeneity of data and statistics;
- The application of science and technology in operational meteorology and hydrology to aviation, transport (air, land and maritime), water resource management, agriculture and other focus areas;
- Activities in operational hydrology as well as closer cooperation between NMHSs in states and territories where they are separate;
- The coordination of research and training in meteorology and related fields.

Information about all the WMO Programmes can be found at http://public.wmo.int/en/programmes.

WMO promotes cooperation in the establishment of networks for making meteorological, climatological, hydrological and geophysical observations, as well as the exchange, processing and standardization of related data, and assists in technology transfer, training and research. WMO also fosters collaboration among the NMHSs of its Members and furthers the application of meteorology to public weather services, agriculture, aviation, shipping, the environment, water issues and the mitigation of the impacts of natural disasters. The WMO vision and mission statement can be found on the Organization's website, along with a description of the seven strategic priorities.

WMO supports the activities of the NMHSs of its Members. This is achieved by providing world leadership in expertise and international cooperation in meteorology, climatology, hydrology and water resources management and related environmental issues. Thus WMO and its Members contribute to the safety and well-being of people throughout the world and to the economic development of all nations.

1.3 WMO EDUCATION AND TRAINING PROGRAMME

As stated in the WMO Convention, part of the Organization's mission is "To encourage research and training in meteorology and, as appropriate, in related fields, and to assist in coordinating the international aspects of such research and training". Thus the ETRP is one of the major scientific and technical programmes.

The overall objective of the ETRP, as approved by Congress, is to assist the NMHSs of Members in ensuring that staff acquire the qualifications and competencies (knowledge, skills and behaviour) required by the WMO Technical Regulations to deliver the meteorological, hydrological and related services mandated by their governments; this can help the NMHSs meet their international obligations. The vision for the ETRP is described in Box 1.1.

The ETRP has four interdependent components encompassing a wide range of activities:

Human resources development provides a framework for assessing the present and future needs of Members for educated and trained personnel;

Training activities contribute to the education and training process with respect to training institutions, in particular RTCs, by facilitating the provision of training materials, instructors and management of training events, and by acting as the interface between Meteorological and Hydrological Services and the international meteorological and hydrological education and training community;

Education and training fellowships assist Members in educating and training meteorological, climatological and hydrological personnel through funding and organization of specially tailored individual and group training programmes, including management and familiarization visits/ study tours for senior personnel;

Support to training events under other WMO Programmes provides monitoring, coordination and assistance in the planning of training events implemented by Members or the Secretariat under other WMO Programmes.

Box 1.1. Vision for the Education and Training Programme

The Executive Council, at is sixty-sixth session, decided that the ETRP needs to remain dynamic and nimble, and adopt approaches that will allow Members to address their continually evolving requirements. The Council further decided that these approaches must:

- Support the further development of education and training capabilities at a national level, particularly in developing and least developed countries, small island developing States and landlocked countries;
- Maximize access to education and training opportunities and resources for all Members, irrespective of geographic location, development status and language;
- Learn from and be guided by best practices within the wider education and training community;
- Be forward-looking and flexible.

Within the Secretariat, the Education and Training Office (hereafter referred to as the ETR Office) supports the day-to-day activities associated with the ETRP. Some key ETRP activities are described in Box 1.2.

The ETRP has promoted the application of information and communications technology in teaching and learning through the use of computer-aided learning initiatives and activities such as CALMet (see section 1.4.2). The ever-expanding networking capabilities of the Internet provide a strong and valuable complement to classroom-based regional educational activities. The challenge for the ETRP, RTCs and Members is to make the most of the advantages of distance and face-to-face learning within the financial and human limitations of training providers and in light of the demand for education and training. Diverse considerations – such as language, Internet availability, reliability and bandwidth, the availability of staff to take the courses on offer and the funding of the existing training opportunities – provide many challenges and innovative opportunities for the ETRP.

Underpinning the ETRP is a commitment to sharing expertise and building capacity through contributing to and facilitating the education and training process, providing educational material and awarding fellowships. The RTCs, along with a variety of other training institutions serving Members, including a network of cooperating universities and advanced training institutions, contribute to the global effort.

Box 1.2. Some key activities of the Education and Training Programme

- Develop and review the standards and requirements for the education and training of meteorologists, meteorological technicians, hydrologists or hydrological technicians in line with changing international regulations, and technical, educational and societal demands;
- Assist regional associations in the development and analysis of training needs assessments;
- Liaise with the WMO technical commissions in the development of the competencies (knowledge, skills and behaviour) required for the specialist areas overseen by each of the commissions;
- Assist NMHSs in training competent staff to provide meteorological, climatological and hydrological information and services;
- Promote capacity development by helping NMHSs to become self-sufficient in meeting their education and training needs and developing their human resources;
- Promote and strengthen the development and exchange of education and training knowledge, resources and expertise among Members, making particular use of technologies and techniques such as e-learning;
- Promote continuing education in meteorology, climatology, hydrology and related disciplines to update the knowledge and skill of NMHS staff in step with scientific, technological and educational advances and innovations and in line with international standards.

1.4 OVERSEEING AND SHAPING THE EDUCATION AND TRAINING PROGRAMME

1.4.1 WMO bodies

The World Meteorological Congress reviews and approves the objectives, purpose and scope of the ETRP. Thereafter, the Executive Council monitors the implementation of the ETRP and can make minor adjustments to it. The implementation of the ETRP is discussed at meetings of the regional associations and technical commissions, and this provides a two-way exchange of views.

Figure 1.2 illustrates how the Education and Training Programme begins by assessing Members' needs. Governance is provided through Congress and the Executive Council, as well as the technical commissions and regional associations, with coordination by the Education and Training Office. This governance sets priorities, processes and procedures, and monitors implementation. Education and training providers include the RTC network, but also many universities, national training centres and other international organizations. These providers offer learning opportunities in the form of courses, workshops and learning resources, some of which are sponsored or co-sponsored by the WMO Secretariat. The learning opportunities help to address the human resources development needs of Members, thus improving the services they provide.

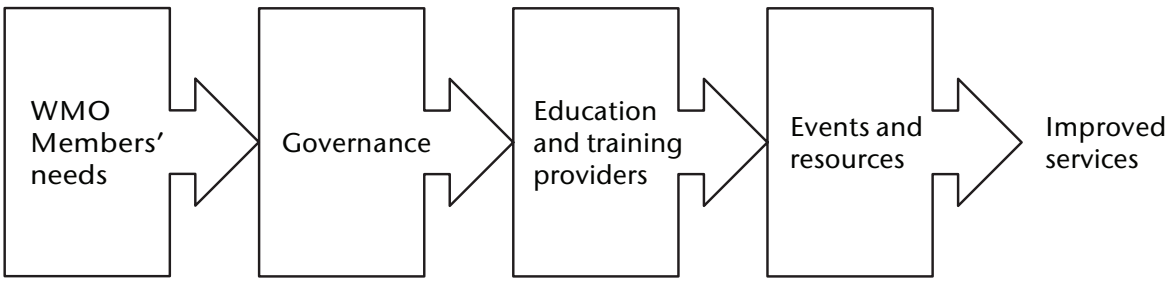


Figure 1.2. The WMO Education and Training Programme

The day-to-day implementation of the ETRP is overseen by the ETR Office. It facilitates advice on all aspects of technical and scientific education and training for Members taking account of the education and training decisions by Congress and the Executive Council and the requirements identified by regional associations and technical commissions. Apart from the ETR Office, there are other bodies that help shape the ETRP and monitor its implementation:

- The Executive Council Panel of Experts on Education and Training (hereafter referred to as the EC Panel), which serves as an advisory body for the Executive Council on all aspects of technical and scientific education and training in meteorology and hydrology. The ETRP is coordinated and guided by the EC Panel whose terms of reference and membership are described in the annex to Resolution 9 (EC-68);

- The national Education and Training Focal Points (hereafter ETR Focal Points), who act as an additional conduit for the two-way flow of information between the Permanent Representative of the country and the ETR Office about the ETRP and related matters;

- The RTC Directors, who provide advice about a variety of issues, including the content and implementation of the ETRP, particularly in so far as the roles and responsibilities of the RTCs are concerned.

See Box 1.3 for more information about the EC Panel, ETR Focal Points, and RTC Directors.

Box 1.3. The Executive Council Panel of Experts on Education and Training, Education and Training Focal Points and Directors of Regional Training Centres

The Executive Council Panel of Experts on Education and Training

The EC Panel monitors progress in the ETRP, provides the Executive Council with proposals for the future direction and activities of the Programme and contributes to the development of the WMO Strategic and Operating Plans. This includes providing advice about standards for education and training, development of the RTC network and operation of the Fellowship Programme. The Panel is chaired either by the President of WMO or by a designated member of the Executive Council. In addition to the Chairperson, the EC Panel has a maximum of twelve members who are appointed by the Executive Council on the basis of their extensive professional expertise in education and training, particularly in the fields of meteorology, climatology or hydrology. Besides acting in a personal capacity, members of the EC Panel are expected to maintain regular contact with regional associations, ETR Focal Points and technical commissions to promote cross-cutting coordination and information exchange. The EC Panel normally meets every two years.

Education and Training Focal Points

The ETR Focal Points have been established to ensure effective and rapid communication between the ETR Office and Members. The ETR Focal Points are appointed by the Permanent Representatives and are expected to assist them in areas such as those associated with fellowships, competency development, qualification, collaboration (including with RTCs), learning needs, and education and training opportunities. In addition, there are ETR Focal Points in the Management Groups of the regional associations which ensure that those Groups consider regional learning needs and priorities, and the contributions RTCs can make in addressing them.

Directors of Regional Training Centres

At least once during each four-year financial period, the RTC Directors meet to (a) improve the effectiveness of RTCs through better coordination with the WMO ETR Office on matters related to fellowships, provision and promotion of training courses and activities within the ETR Office and wider Secretariat; (b) improve implementation of WMO competency and qualification frameworks; (c) identify effective training policies, processes and procedures to address regional and national requirements; and (d) further develop professional relationships and collaboration between RTCs and other institutions. Directors of RTCs might also consider resource mobilization to support their training activities, strategies for the sustainability of RTCs and the RTC network, revenue generation, and development of networking amongst the RTCs.

1.4.2 Coordinating Committee of the Standing Conference of the Heads of Training Institutions of National Meteorological Services

The Coordinating Committee (COCOM) of the Standing Conference of Heads of Training Institutions of National Meteorological Services (SCHOTI) provides informal advice to the ETR Office about the ETRP and related matters.

The Standing Conference is a non-governmental group that provides an informal forum through which the training institutes of the NMHSs can collaborate on education and training activities, with emphasis on issues relating to the introduction and exploitation of new techniques and technologies in the education and training process. It also provides informal advice to the ETR Office about education and training issues affecting Members. The Standing Conference meets during the WMO Symposium on Education and Training, which is held approximately every four years.

As well as acting as an advisory body, COCOM has a working group that organizes a conference/workshop known as CALMet. This is a forum for sharing experiences, expectations and new ideas for applying emerging technologies and strategies in education and training dealing with meteorology and hydrology. At the time of writing, CALMet alternates between a face-to-face and an online event on an annual basis.

1.5 THINGS TO CONSIDER

To help you consolidate the material presented in this chapter or check your understanding, try answering the following questions.

WMO vision and mission

– To what extent are the staff at your RTC aware of the WMO vision and mission?

– What links has your RTC had with the Regional Office for your Region?

Education and Training Programme

– Where can you find out more about the plans and details of the WMO ETRP?

– Which aspects of the ETRP are particularly relevant to your RTC?

– How aware are your staff of the content of the ETRP?

Shaping the Education and Training Programme

– Who are the members of the EC Panel from your region?

– Who are the ETR Focal Points that are relevant for your RTC and how do you contact them?

– Who currently represents the RTCs on COCOM?

2. CONTEXT AND OVERVIEW OF REGIONAL TRAINING CENTRES

This chapter deals with the purpose of RTCs, the general criteria that must be satisfied and why RTCs are important. It includes a description of the designation and reconfirmation of RTCs, with emphasis on the role of self-assessment and the external reviews carried out under the direction of the EC Panel. This is followed by a description of the responsibilities of some key stakeholders: regional associations, Permanent Representatives and Directors and Coordinators of RTCs. Finally, information is given about the planning and reporting requirements for RTCs.

2.1 PURPOSE AND REQUIREMENTS OF REGIONAL TRAINING CENTRES

An RTC is a national education and training institution, or group of institutions, recognized by Congress or the Executive Council (following recommendation by the relevant regional association) as:

– Providing education and training opportunities for Members, particularly NMHS staff;

– Supplying advice and assistance on education and training to Members;

– Promoting education and training opportunities in weather, water and climate for Members.

These tasks are in addition to their national responsibilities and are undertaken in accordance with WMO regulations and guidelines. There are many national institutes that are willing to take international students, provide advice (often at a cost) or promote education and training activities. What distinguishes an RTC from such institutes is the active commitment at regional, national and institute level to carry out these activities for Members. A regional association can recommend that an existing regional institute supported by several Members be designated as an RTC.

In 1965, two institutions were officially designated as WMO Regional Meteorological Training Centres (RMTCs) for the first time, though later the RMTCs were renamed as RTCs. Box 2.1 outlines the establishment and development of the RTC network. The evolution has resulted in a diverse network of institutions providing education and training through the use of residential classes, distance learning and blended learning.

Each institution forming part of an RTC is considered to be an RTC component (this means that there is only one RTC in the host country, whether it has one or more components). To be designated as an RTC component, an institution that undertakes education and training activities related to weather, water and climate shall satisfy the following criteria as specified by the WMO Executive Council:

– An RTC or a component thereof is established only to meet the expressed requirements of more than half of the Members of the regional association that cannot be met by existing resources;

– An RTC or a component thereof is designated to meet the requirements of the Region, as expressed in a decision of the regional association and recorded in a resolution or statement in the general summary of the abridged final report of the regional association session. However, it is recognised that some RTCs or their components might also take on a broader international remit;

– The RTC component is located within the Region concerned, its location decided by the Executive Council in the light of the recommendation of the regional association, the advice of the technical commission concerned and the EC Panel, and the comments of the Secretary-General.

Box 2.1. Establishment and development of the network of Regional Training Centres

In the early years, NMHSs would determine the educational qualifications required of their staff and the training needed for different tasks. But the 1960s saw newly independent states becoming full Members of WMO, rapid increases in technological capability and many scientific advances. These changes drove WMO to increase its focus on education and training. This led to Prof. J. Van Mieghem producing reports covering the professional training of all grades of meteorological staff in less-developed countries, a plan for meteorological training in Africa and a plan for the establishment of a training section in the Secretariat. These were the basis for the ETRP for the next decade.

The establishment of RMTCs was a natural development. The concept was based on a successful regional training course offered by the University of Buenos Aires, in 1958, free of tuition fees to students from other Spanish-speaking South American countries. The first institutions officially designated as RMTCs were the Department of Meteorology, University of Buenos Aires, and the Institute for Meteorological Training and Research in Nairobi, in 1965. By 1996, there were 21 countries hosting RMTCs comprising 31 institutions.

The EC Panel meeting in Nanjing, in 1996, discussed many concerns about the effectiveness of the RMTC network. These considerations led to the Executive Council approving the EC Panel's recommendation to implement a vigorous programme of reviews every eight years to reconfirm RMTCs. This resulted in important changes in the content of the RMTC agreements so that they now include topics such as obligations, withdrawal of the RMTC designation and expiration/termination of the agreement.

In 2006, the Executive Council decided that institutions designated as RMTCs should be renamed as RTCs to allow for specialization in areas other than meteorology.

A review of the future roles and operations of RTCs, established under the auspices of the EC Panel in 2012, revealed that many of the underlying problems identified in earlier reviews still existed. Thus in 2014, on the basis of the recommendations of the EC Panel, the Executive Council revised the criteria for the designation and reconfirmation of RTCs, emphasizing that performance should be the basis for reconfirmation and clarifying the roles of the various groups involved in the creation and ongoing support of RTCs.

More information about the history of RTCs can be found in Celebrating fifty years of WMO Regional Meteorological Training Centres, by Timothy C. Spangler, Gustavo V. Necco and the WMO Secretariat, published in the WMO Bulletin, 64(1), 2015.

There is a set of conditions that shall apply to each institution wishing to be designated as an RTC component. They can be summarized as follows:

- Responding to the education and training needs identified by the regional association;
- Designing education and training on the basis of the aims and requirements of the curriculum and the students;
- Delivering education and training that contribute to meeting regional learning needs using competent instructors and an environment that is conducive to learning;
- Assessing learning of students and evaluating the effectiveness of the education and training;
- Administering and managing the education and training with adequate governance, planning and staffing, and with quality assurance.

The full set of criteria can be found in *Technical Regulations* (WMO-No. 49), Volume I, Appendix B.

The criteria adopted by the Executive Council at its sixty-sixth session (and amended during the sixty-eight session) were intended to:

- Make it more explicit that an RTC is expected to serve regional needs by offering education and training opportunities to Members;

- Emphasize quality assurance in training management and delivery;

- Make more explicit links to the approved Competency Requirements for Education and Training Providers for Meteorological, Hydrological and Climate Services (hereafter Competency Requirements for Education and Training Providers);

- Emphasize the roles of the regional association and the Permanent Representative of the host country in the operation of a successful RTC.

A Member should only submit an application for an institution to be designated as an RTC if the required human and financial resources, and facilities are available to support the RTC in carrying out its full functions. It is strongly recommended that any country wishing to host an RTC talk with the ETR Office as well as the president of the relevant regional association before formally submitting an offer.

Hereafter a distinction will not be made between an RTC with a single component and an RTC with multiple components, unless there are specific reasons to do so. Consequently, when reference is made to an RTC, this will usually cover either one component of a multiple-component RTC or a single-component RTC. This will avoid repetitive use of the term "RTC component".

2.2 IMPORTANCE OF REGIONAL TRAINING CENTRES

2.2.1 Why Members need a healthy and vibrant network of Regional Training Centres

There are two key reasons why Members need a healthy and vibrant RTC network; they are associated with delivering the ETRP and the increasing demand for education and training.

The RTCs can play a key role in delivering parts of the ETRP concerned with producing adequately trained staff, promoting capacity development, sharing expertise and promoting continuing education and training. In particular, RTCs are expected to play major education and training roles for those Members that do not have the required facilities or resources to be self-sufficient. In addition, a Member hosting an RTC might want to collaborate with RTCs in other regions to develop specific expertise that is not readily available locally.

There are increasing demands for education and training associated with, for example, the development of climate services, the establishment of competency requirements developed by technical commissions, and recognition of the importance of enhancing expertise in management, communications and related areas. The retirement of the large number of personnel recruited in the 1970s and 1980s will lead to an increased need to train new staff. Regional Training Centres can contribute to addressing this increase in requirement for education and training and the challenges of fast-developing technologies and science.

2.2.2 Benefits for Members hosting Regional Training Centres

There are potential benefits for Members hosting RTCs and for the implementation of the ETRP. Perhaps the most important is that RTCs provide facilities and support (sometimes financial) for events such as:

- Meetings (for example, training workshops) organized by WMO in cooperation with other international organizations;

– Courses (for example, scientific and technical training) for the NMHS of the hosting WMO Member;

– Training events organized by other institutions such as the Intergovernmental Oceanographic Commission of the United Nations Educational, Scientific and Cultural Organization (IOC-UNESCO), the UK Met Office and the European Organization for the Exploitation of Meteorological Satellites (EUMETSAT);

– Courses hosted on behalf of other RTCs (for example, the Institute for Meteorological Training and Research (Nairobi) (IMTR) hosted a course on the African Monitoring of the Environment for Sustainable Development (AMESD) programme on behalf of RTC Niger).

These activities bring additional expertise to the institution and can benefit the host country. Some additional potential benefits are described in Box 2.2.

Box 2.2. Some additional potential benefits of hosting Regional Training Centres

- **Raising visibility**. Having RTC status can raise the visibility of an institution on a national, regional and global basis and thereby attract more students and increased financial support;
- **Supporting capacity development**. RTCs support capacity development by providing services at the RTC or by sending instructors to provide training at NMHSs;
- **Identifying education and training needs**. RTCs can take the lead or be a key contributor to identifying national or regional education and training needs;
- **Eliciting funds to support international students**. Being designated as an RTC provides institutions with an increased ability to elicit funds from governments to support international students;
- **Providing advice to the Secretariat**. RTCs can be points of contact for the Secretariat in the development of activities and policies concerned with education and training;
- **Acting as agents**. RTCs can act as WMO agents in their own countries and as an interface between WMO initiatives and national education and training systems;
- **Improving infrastructure**. Having RTC status provides increased opportunities to obtain national and international support to improve infrastructure (for example, computing facilities) which then benefits the wider meteorological community;
- **Providing consultancy services**. RTC status provides an opportunity to offer consultancy services which provide an additional source of income and help develop expertise.

2.3 VARIETY OF REGIONAL TRAINING CENTRES

There is an enormous variety of institutions forming part of the RTC network. At the top level, these institutions fall into three broad categories:

– National training institutions, usually part of a NMHS, which provide job-related training with the content determined primarily by the needs of the NMHS;

– Universities that provide education in meteorology, hydrology or related sciences with the curriculum and length of courses usually determined by national standards. Some universities might also provide job-related training when requested to do so;

– Regional institutions, such as the Caribbean Institute for Meteorology and Hydrology (CIMH), the African School of Meteorology and Civil Aviation (Ecole africaine de la météorologie et de l'aviation civile (EAMAC)) and AGRYHMET (Centre Régional de

Formation et d'Application en Agrométéorologie et Hydrologie Opérationnelle) in Niger, that have a regional role and regional funding to maintain the facilities and support the education and training needs of the countries that have created them.

A closer look at RTCs shows even greater variety. There are RTCs that:

– Specialize in aeronautical meteorology, biometeorology, agricultural meteorology, marine meteorology, monsoon meteorology, meteorological instruments, radar and satellite meteorology, and hydrology;

– Offer education and training to students from Members that are outside their own regions;

– Specialize in long courses (such as degrees) or short courses aimed at continuous professional development, though some RTCs might do both;

– Use different languages as a basis for instruction and study;

– Provide courses that satisfy the WMO requirements for meteorologist and/or meteorological technician;

– Offer courses that address the knowledge and skill requirements of competency frameworks developed by WMO technical commissions.

This variety is a strength of the RTC network as it allows flexibility in the individual institutions responding to national and regional needs.

Where an RTC has multiple components, it is important that their activities are coordinated to maximize the benefits that the RTC can bring to the international community. Box 2.3 outlines the way in which the activities of a specific RTC with three components are coordinated.

2.4 PROCESS FOR DESIGNATION AND RECONFIRMATION OF REGIONAL TRAINING CENTRES

2.4.1 Designation

It is the responsibility of regional associations to recommend nominations for new RTCs to the WMO Executive Council based on an assessment of whether the proposed institution will:

– Assist the association in addressing its expressed training needs;

– Meet the Executive Council criteria to be designated as an RTC;

– Provide benefit to the Members, noting the cost and resource implications of increasing the number of RTCs with no increase in budget.

Before the Permanent Representative of the host country submits a formal proposal to the regional association to host a new RTC, it is strongly recommended that the institution and host country survey the Members to build a business case for the RTC based on the Members' training needs and their ability to fund students at the proposed RTC. A well-argued business case is more likely to be supported than an offer of places at a national training institution that are funded solely by the Secretariat. The kind of information that might be included in a business case is given in Box 2.4.

The Permanent Representative wishing to offer the national training facilities of his/her country as an RTC submits a proposal for consideration and recommendation by the regional association, or by its president on behalf of the regional association. Thereafter the normal procedure is as follows:

– A representative of the WMO Secretary-General surveys the training facilities and programmes of the proposed RTC, and assesses its compliance with the criteria for the designation of an RTC, using the template in the Guidelines for the Recognition or Reconfirmation of WMO Regional Training Centres available at https://www.wmo.int/pages/prog/dra/etrp/rtcs.php. This step will usually include a site visit to the RTC;

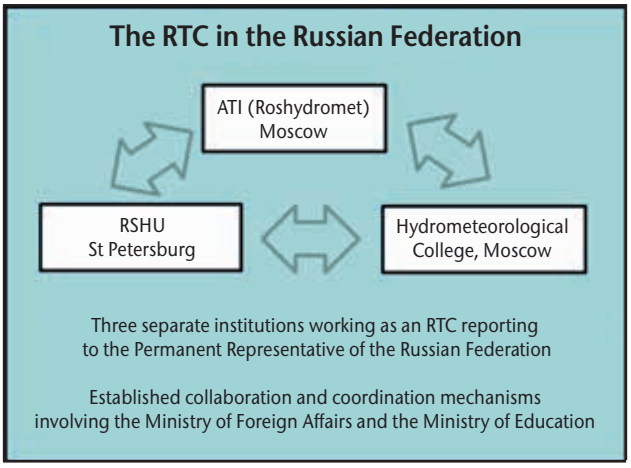
– The EC Panel, or its Chairperson on behalf of the EC Panel, considers the recommendation of the regional association, or its president, and the report of the Secretariat's mission;

– The Executive Council considers the recommendation of the EC Panel.

Box 2.3. Coordination of activities in the Regional Training Centre of the Russian Federation

The RTC in the Russian Federation is made up of three components:

- The Russian State Hydrometeorological University (RSHU) in Saint Petersburg;
- The Advanced Training Institute (ATI) of Roshydromet in the Moscow region;
- The Moscow Hydrometeorological College (MHT) in the Moscow region.



Each component has different sponsoring organizations with different national requirements and responsibilities. To help them work together, representatives of the three components form the Coordinating Council of the RTC which meets once per year under the chairmanship of the Head of Roshydromet who is also the Permanent Representative of the Russian Federation with WMO. Representatives from the Ministry of Foreign Affairs and the Ministry for Education and Science are included in the Coordinating Council because of their involvement in the provision of fellowships and support from the Government. Sometimes representatives from other institutions in the Russian Federation are involved. Each session of the Coordinating Council reviews the activities of the RTC components and, each year, an action plan is prepared with the RTC Executive Director being responsible for monitoring implementation.

Strategic partnerships have been established between Roshydromet and some universities in the Russian Federation offering educational programmes in meteorology, hydrology and related subjects, RSHU being one of them. Such partnerships cover a wide range of topics including research activities, applications of research, integrated educational programmes, and promotion of hydrometeorological education and training for Members.

After endorsement by the Executive Council, the establishment of the RTC is subject to an agreement drawn up between WMO and the host country and/or organization. This usually covers the following aspects:

– Scope of the agreement;

- Purpose and functions of the RTC;
- Criteria for designation and reconfirmation;
- Obligations of WMO and the host country;
- Duration and renewal;
- General provisions.

A template for an RTC agreement can be found at https://www.wmo.int/pages/prog/dra/etrp/rtcs.php.

Box 2.4. Business case for being designated as a Regional Training Centre

The primary purpose of a business case is to record the justification for a proposal and persuade a decision-maker to approve some kind of action. In addition, a business case provides accountability for both the originator and decision-maker who must show, either now or in the future, that the decisions made today are good business decisions, based on currently available information and reasonable assumptions.

There is no single correct format or content list for a business case. However, what follows is a selection of items that might be included in a business case for a new RTC:

- Strategic considerations: State how the proposal fits into the long-term plan;
- Assumptions and constraints: Identify and assess assumptions (mainly long-term) and constraints (mainly short-term);
- Market analysis: Assess what is already available, understand what users want and identify potential users;
- Appraisal of options: Describe what options were considered and which were chosen;
- Expected benefits: Identify the benefits that will arise and any unavoidable disadvantages;
- Financial case: List costs, investments and funding arrangements;
- Organizational considerations: Describe impacts on the organization (for example, facilities, staffing and procedures);
- Risks and uncertainties: Identify major risks and uncertainties, their likely impact and how to mitigate them;
- Implementation: List actions required to achieve the intended outcome.

2.4.2 Reconfirmation

Following a review in 2014 of the Executive Council criteria for the designation and reconfirmation of RTCs, at each session a regional association considers whether to recommend to the Executive Council the reconfirmation of existing RTCs. Normally, the Secretary-General will draft a paper for a regional association session that provides a summary of the performance of RTCs in the Region in the last four years and what is known of their plans. The RTC annual reports (describing activities in the previous12 months and plans for the next 12 months with an outlook for future years) are important sources of information for the regional association and ETR Office when drafting the Secretary-General's paper. If the RTC does a significant amount of training for students from outside the Region, feedback from the relevant regional associations would be of value. A key consideration is whether an RTC still meets the requirements of the Members of the regional association.

To complement the regional association's monitoring of the performance of an RTC, there will also be an external review of the RTC carried out under the auspices of the EC Panel on an eight-

year cycle. The primary aims of the external review are (a) to assess whether the RTC continues to meet the criteria for reconfirmation, and (b) to make a recommendation on reconfirmation to the Executive Council and regional association. The reconfirmation process also supports the RTCs in providing high-quality training programmes for meeting regional training needs. More information about the purpose of the review process is given in Box 2.5.

Box 2.5. Purpose of the external review process

The external review process is designed to:

- Assess the extent to which an RTC satisfies the current WMO criteria for the designation of an RTC;
- Reveal the strengths of the training programmes provided by the RTC and areas for development;
- Support the RTC in identifying ways of developing its training processes so as to enhance the quality, relevance and scope of what is on offer;
- Monitor the support given to WMO fellows;
- Help the RTC obtain potential leverage to acquire critically-needed resources.

The views of both the regional association and EC Panel would be included in the paper on education and training prepared by the Secretary-General for the Executive Council. Finally, the Executive Council decides whether or not to reconfirm the RTC.

Though this is not part of the official review process, about four years after a new RTC has been designated, an informal review might take place on the basis of the yearly reports and a summary of accomplishments and plans submitted to the EC Panel. This provides an opportunity for the RTC to report on progress, highlight any difficulties encountered and seek advice about how to enhance its training.

The next section gives more information about the external review process.

2.5 EXTERNAL REVIEW OF REGIONAL TRAINING CENTRES

2.5.1 Overview

The external review is carried out by a Review Team. This normally consists of a member of the EC Panel, as convenor, a member (not from the RTC being assessed) nominated by the Permanent Representative of the country hosting the RTC, and a member nominated by the president of the regional association, preferably from another RTC. Where possible, someone from the ETR Office supports the Review Team. The convenor is appointed by the EC Panel or by its Chairperson.

The external review process normally consists of five main steps:

– Creation of the Review Team led by one of the EC Panel members with input from the host country, the host regional association and the Secretary-General;

– Review of the RTC annual reports and the RTC self-assessment form as a preliminary assessment;

– Formal review, including a site visit if necessary and possible, by a Review Team consisting of one or more members from outside the host country; the report assesses the extent to which the RTC criteria are being met and describes any shortcomings (Box 2.6 shows the ratings used for RTCs that have undergone an external review);

– Formal response to the Review Team's report and findings, particularly any recommendations by the host institution, the Permanent Representative of the host country, the EC Panel and the regional association;

– Decision by the Executive Council on whether to reconfirm the RTC or not.

After the external review process has been completed, the Executive Council decides whether or not to reconfirm the RTC on the basis of the recommendations from the EC Panel and regional association.

For RTCs with university components, or components accredited by a national education authority, the external review should take into account the autonomous assessment procedures. Therefore, the Review Team's assessment of such an RTC should be focused primarily on its vocational training activities.

Box 2.6. Ratings of Regional Training Centres that have undergone an external review

Fully meets the established criteria. There are no significant problems to be identified. Recommendations associated with this rating would be pointing out best practice for other RTCs, preventative measures or opportunities for incremental improvement to maintain or enhance quality.

Partially meets the established criteria. The RTC meets some of the criteria, but there is significant room for improvement. Recommendations associated with this rating would be of a corrective nature and could lead to a delay in the designation or reconfirmation of the institute as an RTC.

Does not meet the established criteria. This would lead to recommendations of a corrective nature that would have to be fully addressed for the institute to be designated or reconfirmed as an RTC.

2.5.2 Modes of external review

A risk-based approach is used to decide whether the review of a specific RTC should include an onsite visit; this provides a balance between reducing operational costs and ensuring the RTC network continues to benefit from external reviews.

The Chairperson of the EC Panel brings a recommendation regarding the mode of inspection of an RTC to the Executive Council. The options available include:

– An onsite review by all or some members of the Review Team;

– An onsite review by an officer of the Secretariat whilst visiting on other business, carried out under the auspices of the Review Team;

– An offsite review by the Review Team based on an assessment of documentation provided by the RTC.

A recommendation about the mode of the review will be made after:

– Reviewing the RTC annual reports and self-assessment questionnaire;

– Communicating with the host institution, the Permanent Representative of the host country and the regional association's president;

– Considering the available financial resources;

– Consulting with the Secretary-General.

An offsite review would be suitable for a consistently well-performing RTC as demonstrated by its self-assessment, previous review and annual reports. Also an offsite review might be carried out if the security situation in the country makes a visit difficult to arrange.

2.5.3 Self-assessment

The RTC self-assessment is a key source of information for the external review. Consequently, it is essential that RTCs provide it promptly on request and that the responses accurately reflect the current situation. Performing this assessment might lead to the RTC correcting, or planning to correct, some deficiencies before the external review takes place. In this case, information about any corrective action should be included in the self-assessment.

An RTC includes in the self-assessment an appraisal of the current training programmes and the extent to which the institute or institutes satisfy the current RTC criteria. The self-assessment is carried out using a questionnaire provided by the ETR Office (an example is provided in the Guidelines for the Recognition or Reconfirmation of WMO Regional Training Centers available at https://www.wmo.int/pages/prog/dra/etrp/rtcs.php). The criteria to be used by an RTC for its self-assessment are summarized in Box 2.7. Documentation supporting the answers given in the questionnaire should be available for the Review Team.

Box 2.7. Self-assessment of Regional Training Centres

The RTC self-assessment is based on the criteria that have to be met by each RTC component, or in collaboration with other RTC components, as referenced in Resolution 15 (EC-66). These criteria cover:

- Identifying learning needs;
- Designing and delivering the learning service;
- Assessing learning and evaluating the learning service;
- Administering and managing the learning service.

The self-assessment includes:

- Indicating whether the RTC fully meets, partially meets or does not meet each of the criteria;
- Providing key evidence to support the assessment of each criterion; some suggestions for possible evidence are given for each criterion, but this does not restrict what can be provided.

2.6 RESPONSIBILITIES OF PARTIES INVOLVED IN REGIONAL TRAINING CENTRES

The Executive Council is responsible for the designation and reconfirmation of RTCs. The Permanent Representative of the host country, the Director of an RTC component and the Coordinator of an RTC also have responsibilities based on the following principles:

– Regional associations should have an ongoing involvement with RTCs in their Region. They should provide the RTCs with information about regional education and training needs and feedback on their performance;

– Permanent Representatives of countries hosting RTCs should support their RTCs and promote their activities nationally and regionally;

– RTCs should actively promote the courses being offered to Members, coordinate their activities with other RTCs in the Region and show how they have taken the regional education and training needs into account when developing their education and training activities.

Box 2.8 provides more information about the responsibilities of some key stakeholders and has a link to the full set of responsibilities.

Box 2.8. Responsibilities of some key stakeholders of Regional Training Centres

The following points summarize the responsibilities of regional associations, Permanent Representatives, Directors of RTC components and coordinators of RTCs with multiple components:

- Regional associations prioritize education and training needs, support, promote and monitor the activities of RTCs, and make recommendations on the confirmation (designation or reconfirmation) of RTCs;
- Permanent Representatives facilitate coordination between RTCs and regional associations, promote the resourcing of RTCs, provide annual reports about the activities of each RTC and promote collaboration between RTCs;
- The Director of an RTC component monitors, plans and reports on the activities of the component, promotes its services, works with other RTC components and seeks ways of expanding the RTC component's ability to address the regional education and training needs;
- The Coordinator of an RTC with multiple components coordinates the activities of the RTC and the preparation of its annual report, coordinates arrangements promoting the RTC's services and sharing of resources and information, and supports the RTC components in seeking ways of expanding their ability to address the regional education and training needs.

The full set of responsibilities can be found in *Technical Regulations* (WMO-No. 49), Volume I, Part VI, section 1.5.2.

The performance and ongoing status of the institution(s) making up an RTC are dependent upon each of the parties addressing their responsibilities. Failure of one party to carry out its role could jeopardize any subsequent reconfirmation of RTC status.

2.7 THINGS TO CONSIDER

To help you consolidate the material presented in this chapter or check your understanding, try answering the following questions.

Your Regional Training Centre

– What type of RTC are you involved in and what are its specialisations?

– If there are multiple components to the RTC in your country, how are their activities coordinated and who is the RTC Coordinator?

– How do Members benefit from the activities of your RTC?

– How does the Permanent Representative of your country promote your RTC and what information do you provide to the Permanent Representative?

– Which countries does your RTC target?

Reconfirmation of a Regional Training Centre

– When do you expect your RTC to go through its next reconfirmation process?

– What, if any, recommendations did the EC Panel make in the last review of your RTC? What was the response of the Permanent Representative and the RTC? How many of the recommendations have been implemented?

Planning and reporting

– What types of plan are prepared to support the activities of your RTC?

– What conclusions do you draw about the activities of your RTC based on the last annual report prepared for your Permanent Representative?

3. MANAGING THE LEARNING PROCESS

There are essentially three aspects to the management and operation of an RTC:

– The learning process;

– The resources and facilities required to support the learning process;

– External relationships and activities, with emphasis on the coordination and promotion of the RTC with the parent regional association and other partners.

These tend to overlap, but it is convenient to deal with them separately. Consequently, this chapter will deal with managing the learning process. The other two aspects will be covered in chapters 4 and 5.

3.1 SOURCES OF INFORMATION AND NOMENCLATURE

In this chapter, reference will be made to *Guidelines for Trainers in Meteorological, Hydrological and Climate Services* (WMO-No. 1114)[1] (hereafter *Guidelines for Trainers*) which provides more detailed guidance about how to carry out the learning process. This involves:

– Identifying regional learning needs;

– Determining learning solutions;

– Developing learning activities and resources;

– Delivering training;

– Monitoring and evaluating learning activities.

This guidance is provided in the context of the competency framework for personnel involved in training included in *Guidelines for Trainers* (see also section 3.3.2 of this Guide). It is expected that any institution providing education and training services to current and future meteorologists and hydrologists will have staff somewhere within the organization who together cover all the competencies. The following sections of this chapter address each aspect of the learning process.

As discussed in section 2.3, there are several types of RTC, with most falling into the following two categories:

– Institutions (usually part of an NMHS) providing job-related training. The training is provided by trainers and the people receiving the training are trainees;

– Institutions that are part of a university and primarily provide education designed to develop knowledge and critical thinking skills. The education is provided by lecturers (also called instructors or teachers) and the people receiving the education are students.

In order to avoid repeating the expression "education and training" to cover the activities of both types of RTC, hereafter "training" will be used to refer to the activities of an RTC irrespective of whether it is a training institution or university. Similarly, to overcome the problem of having to use a variety of words for people working at an RTC and the course participants, the terms "trainer" and "learner" will be used.

[1] Available from http://library.wmo.int/pmb_ged/wmo_1114_en.pdf.

3.2 UNDERSTANDING THE LEARNING PROCESS

The learning process can be described by the learning cycle which is depicted in Figure 3.1. The progression from one stage to the next is represented by clockwise arrows, but often each step involves a period of iterative feedback before the next stage is reached. Alternative models place evaluation at the centre, because (a) evaluation can be performed for formative purposes during the learning cycle, and (b) learning, course and programme evaluation results can suggest changes in each of the other steps in the cycle.

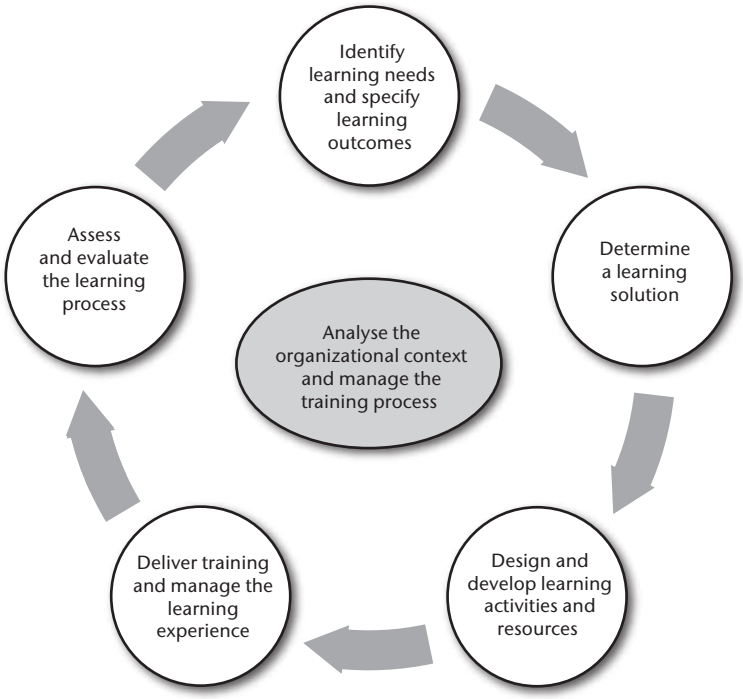


Figure 3.1. The learning cycle

Analysing the organizational context and managing training processes are covered in detail in chapters 4 and 5. These tasks underpin the implementation of all stages of the learning cycle within RTCs or other training institutions.

For any RTC, it is likely that international learners will come from NMHSs or those intending to work for NMHSs. Education and training play key roles in helping those NMHSs meet their strategic aims whilst motivating individuals and improving their performance. Knowing something about those NMHSs will help with understanding what the learners and their organizations want to get from the training and the context in which the learners will work when returning to their job. The trainers within an RTC should also be aware of what is happening within their own organization and of the internal and external factors that are shaping its future.

For managing the learning process, it is useful to consider the five steps illustrated in Figure 3.1, though in practice these steps are not necessarily completely discrete. They might overlap with several steps being carried out at the same time.

An RTC that has a university component will concentrate on developing background knowledge and critical thinking skills in line with national academic requirements rather than preparing learners for specific job tasks. Consequently, for such an RTC it might not be necessary to identify learning needs in the same way as would be required of an RTC that provides only vocational training. Nevertheless, universities increasingly seek to understand the needs of the national

and international labour market and to tailor their courses accordingly, so carrying out learning needs assessments might also be suitable for a university-based RTC. Box 3.1 describes how one university-based RTC goes about this process.

Box 3.1. How the Russian State Hydrometeorological University assesses the needs of the labour market

The Russian State Hydrometeorological University (RSHU) in Saint Petersburg is a component of the RTC of the Russian Federation. The following points outline how it goes about understanding the needs of national and international labour markets by working closely with potential employers:

- In accordance with the recent changes in legislation on education and science, all education programmes have to be approved, in addition to the university's highest authority, by one of the employers. This provides an opportunity for RSHU to address the labour market needs at an early stage in the education of future specialists;
- RSHU organizes meetings and holds discussions with employers about their requirements;
- RSHU participates in meetings of the NMHSs from the Commonwealth of Independent States (CIS) and thereby gains information about regional training needs;
- RSHU invites representatives of potential employer organizations as members of the Examinational Board for the final exams and thesis defence of the bachelor students in hydrometeorology;
- RSHU provides opportunities for students to get training and work experience at Roshydromet (the Russian hydrometeorological service) and other NMHS partners in various parts of the world. An example is the participation of some RSHU students as meteo-volunteers for the Olympic Games in Sochi in 2014 (see Mamaeva, M. and A. Kanukhina, 2014: *WMO Bulletin*, 63(1): 21–22).

Guidelines for Trainers, chapter 3, provides more information about analysing the organizational context and managing training processes.

3.3 USING COMPETENCIES

3.3.1 Transferable skills and technical and scientific competencies

Competencies specify the knowledge, skill and behaviour required to perform a specific job. These build upon the core knowledge required of someone in a particular profession. Competencies fall into two broad categories:

Transferable skills: These include analytical, problem-solving, communication and people management skills, and the ability to work in a team. They are applicable to many jobs, although some call for higher levels of skill in some areas, or for unique applications of those skills. Transferable skills are sometimes referred to as core competencies;

Technical and scientific competencies: These tend to be more job specific. Within an NMHS they cover the competencies required for activities such as observing, maintaining or developing equipment, and forecasting. The WMO technical commissions are developing competency frameworks for many service and support areas. These can be found in *Technical Regulations* (WMO-No. 49), Volume I.

As shown in Figure 3.2, transferable skills and core knowledge underpin the technical and scientific competencies required of someone working in a specific professional area. They also provide a basis for the development of additional technical and scientific competencies when employees move to a new job in the same professional area. For staff in NMHSs, the

core knowledge might be that specified by the Basic Instruction Package for Meteorological Technicians (BIP-MT) or the Basic Instruction Package for Meteorologists (BIP-M) (see *Guide to the Implementation of Education and Training Standards in Meteorology and Hydrology* (WMO-No. 1083)).

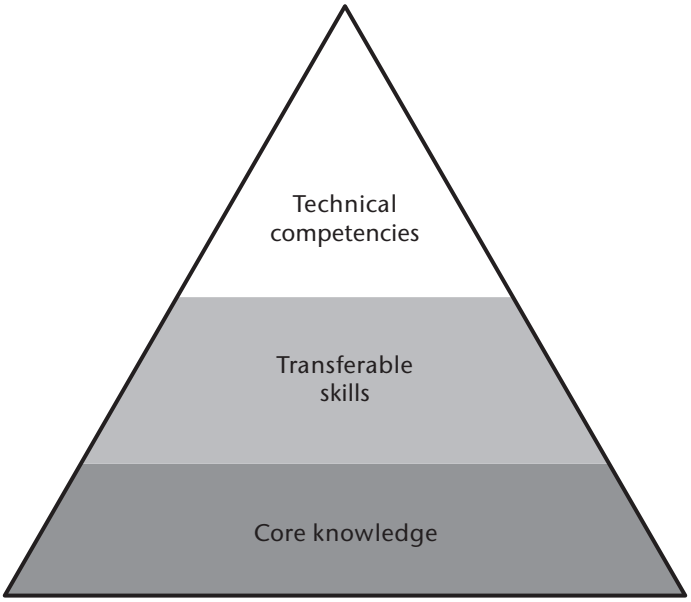


Figure 3.2. The core knowledge and transferable skills underpin specific technical and scientific competencies.

Regional Training Centres tend to deal primarily with the core knowledge and technical/scientific competencies. Increasingly, however, transferable skills are considered to be important to help promote learning and support a wide range of jobs. This has led to the development of some transferable skills (for example, communication and team-working skills) being included in the courses run by some RTCs.

Sometimes national or occupational competency frameworks already exist. This is particularly so for management and information technology jobs where the required competencies tend to be similar across many organizations. It is important that RTCs be aware of any such frameworks used in the institutions to which the learners belong and, where possible, provide transcripts showing what aspects of those frameworks have been addressed by the learning activity.

3.3.2 Training competencies developed under the auspices of WMO

The training competencies developed by WMO can be summarized as follows:

- **Analyse the organizational context and manage the training process**: The organizational context is analysed and training plans, policies and processes are developed and monitored for effectiveness;

- **Identify learning needs and specify learning outcomes**: A systematic approach is used to identify organizational and individual learning needs which are then specified in terms of a set of learning outcomes;

- **Determine a learning solution**: The learning solution is determined and a plan is prepared for implementing the chosen solution;

– **Design and develop learning activities and resources**: The design and development of learning activities and resources are grounded in evidence-based learning theory, support the learning process and address the specified learning outcomes;

– **Deliver training and manage the learning event**: Classroom and/or distance-learning courses are delivered in an environment that fosters and sustains learning;

– **Assess learning and evaluate the learning process**: Learning is assessed against the required learning outcomes, and training activities, events and programmes are monitored and evaluated to improve learning processes.

It is not necessary that each person has the full set of competencies, but within an RTC all these competencies should be covered.

More detail about the training competencies, including the associated performance criteria and knowledge requirements, can be found in *Guidelines for Trainers*.

3.3.3 WMO competency standards

The Sixteenth World Meteorological Congress recommended that all technical commissions make the definition of competency standards a high priority because they:

– Promote high standards and consistency of service;

– Guide resource allocation for capacity development;

– Help ensure that training addresses true job needs.

The approach taken is for a technical commission to establish a task team to develop the competency framework on the basis of wide-ranging consultation. Then the top-level competencies are approved by the relevant technical commission.

As an example, Box 3.2 gives the top-level competencies for Aeronautical Meteorological Forecaster.

Box 3.2. Top-level competencies for an Aeronautical Meteorological Forecaster

Members, taking into consideration:

– The area and airspace of responsibility,

– The impact of meteorological phenomena and parameters on aviation operations,

– Aviation user requirements, international regulations, and local procedures and priorities,

should ensure that an Aeronautical Meteorological Forecaster has successfully completed the BIP-M and is able to:

1. Analyse and monitor continually the weather situation;

2. Forecast aeronautical meteorological phenomena and parameters;

3. Warn of hazardous phenomena;

4. Ensure the quality of meteorological information and services;

5. Communicate meteorological information to internal and external users.

(Based on *Technical Regulations* (WMO-No.49), Part V, section 1.2)

The second-level competencies specify the detailed performance criteria and knowledge and skill requirements as guidelines. Members may select a subset of second-level competencies to suit their own circumstances.

The status of competencies being developed by the WMO technical commissions can be found at https://www.wmo.int/pages/prog/dra/etrp/competencies.php. This information enables RTCs to offer training in the relevant competencies to staff from NMHSs.

3.3.4 Competency-based training process

The introduction of the WMO competency frameworks can influence each aspect of the learning cycle (see Box 3.3). These frameworks guide training providers on what and how to train, and inform the learners' organizations about what will be gained from participation in a particular learning opportunity.

Box 3.3. Influence of competency-based training on the learning cycle

Identify learning needs and specify learning outcomes. Competency frameworks help to specify learning needs by allowing training providers to choose and prioritize learning outcomes on the basis of assessments of the learners' current competencies.

Determine a learning solution. Depending on the competencies to be developed, practical exercises using, for example, real or simulated workstations or instruments may be desirable. In such cases, face-to-face learning in equipped laboratories or on-the-job training could be the best learning solutions.

Design and develop learning activities and resources. Because job competencies are driven by the ability to apply skills, active learning approaches that allow practical applications will be called for. Background knowledge is still a prerequisite, but not enough on its own to ensure that the required competencies are developed.

Deliver training and manage the learning experience. Due to the practical learning outcomes required, learners will need more opportunities for practice, with feedback and coaching from trainers to ensure that they are developing skills at the expected levels.

Assess learning and evaluate the learning process. To determine whether the required competencies have been acquired, the learners should be assessed. This should include learners performing tasks in conditions that are as real as possible. An evaluation of training should demonstrate that the learners show improved performance of the competency when they return to their job.

Unless specific formal arrangements have been made on a regional, subregional or bilateral level, certification of competency is done on a national basis following national defined and agreed procedures. Regional Training Centres can and should contribute to the development and assessment of the underpinning knowledge and skills but normally would not certify that individuals have met the competency requirements for another country.

At the time of publication, WMO was in the process of preparing a *Guide to Competency* which will provide detailed information on competency assessment and competency-based training. There is also an International Standard that specifies requirements for certification bodies to operate in a consistent, comparable and reliable manner: *ISO/IEC 17024: Conformity assessment – General requirements for bodies operating certification of persons*. If an RTC is involved in the certification of competency, it should either conform to this standard or, at least, take into account the general principles that underpin the standard. See Box 3.4 for more information about the content of *ISO/IEC 17024* and the associated general principles.

The relevant competency frameworks should always be consulted in making training decisions. Announcements and course descriptions should clearly state the competencies to be addressed. Completion certificates should be accompanied by a transcript detailing the underpinning knowledge and skills of the competencies that were addressed during the learning event.

Box 3.4. *ISO/IEC 17024*: Content and general principles

This International Standard specifies requirements for the operation of certification bodies. Here certification is taken to be an assessment process that provides assurance that someone has the required competencies.

As well as dealing with detailed general requirements and those associated with structure, resources, records, certification process and management system of the certification body, the standard includes a set of principles. Applying these principles is worthwhile whenever an RTC has responsibility for assessing competence. The following points describe some of those principles in a way that is relevant for an RTC:

- Assessment of competence should be based on objective evidence obtained through a fair, valid and reliable assessment and not influenced by other interests or by other parties;
- The assessment process and the personnel carrying out the assessment should be perceived as impartial to give confidence in the assessment activities and outcomes;
- The assessment process should ensure that there is sufficient objective evidence on which to base a decision about competence;
- A person assessing competence should be competent to carry out that task;
- There should be an effective process for the resolution of complaints and appeals as a protection against errors, omissions or unreasonable behaviour.

3.3.5 Capability frameworks

In addition to the competency frameworks associated with specific jobs, a capability framework deals with the ability of an organization to achieve its desired outcomes. The capability framework usually encompasses the transferable skills noted in section 3.3.1. Such a framework is of particular value in ensuring adequate leadership of an organization. For example, the capability framework for the Australian Public Service deals with qualities such as:

– Shaping strategic direction;

– Cultivating productive working relationships;

– Communicating in an influential way;

– Exemplifying personal drive and integrity;

– Achieving results.

These are some of the qualities required for the collective leadership of most organizations, including an RTC. Staff members with leadership potential should be made aware of the required qualities so that they can be included in personal development plans.

3.4 IDENTIFYING REGIONAL LEARNING NEEDS

3.4.1 General considerations

Learning needs analysis – also referred to as training needs analysis – is the systematic gathering of information about any gaps in the knowledge, skills and behaviour of staff. It takes into account current and future organizational requirements and the capabilities of individuals. These needs can be associated with a variety of factors such as:

– Organizational objectives or strategy, for example, increased income, enhanced customer satisfaction or expansion/contraction of the workforce;

– Work force changes, for example, increase in demand for meteorologists resulting from expansion of the workforce, more retirements than usual, or emerging requirements;

– Products or services, for example, new services for the public or commercial customers;

– Sources of information, for example, new remote-sensing data or output from a forecasting model;

– Work practices, for example, new forecaster workstations;

– National or international standards, for example, new international standards for the provision of specific services.

In addition to responding to changing requirements (doing new things), organizations need to maintain (doing things well) and develop (doing things better) the core expertise of staff, even if there are no changing requirements and capabilities. Regional Training Centres can have a role in addressing all these learning needs.

3.4.2 The Regional Training Centre perspective

Most RTCs work within their national environment:

– For an RTC that forms part of an NMHS or is a regional institution, there will usually be processes in place to identify learning needs in direct response to the requirements of the hosting NMHS or the organizations supporting the regional institution;

– For an RTC that is part of a university, the education provided might be based on national or international academic standards with little requirement to directly identify learning needs. However, increasingly universities are expected to meet the needs of the labour market. This might involve identifying the learning needs of a specific type of economic activity (for example, provision of meteorological or hydrological services) and adopting a programme of study that meets those needs.

Identifying regional learning needs is much more of a challenge. Consequently, RTCs will need to respond to the prioritized regional training requirements provided by the regional association. These should take into account the areas of expertise of each of the RTCs.

In principle, RTCs should just respond to the learning needs identified by others, but in reality RTCs (and any education or training institutions) need to be proactive. This could be accomplished by:

– Suggesting where additional information on regional learning needs might be found;

– Contributing to identifying regional learning needs;

– Ensuring regional associations are knowledgeable about the capabilities and expertise of the RTCs.

It would also be desirable for RTCs to make regional associations aware of how they have contributed to satisfying regional learning needs in the past.

3.4.3 Keeping abreast of regional learning needs

Though regional associations should provide information about regional learning needs, RTCs can use various means to keep abreast of those needs. Here are a few suggestions:

– Maintain communication with the ETR Office and, through the Permanent Representative of the host country, with the relevant WMO Regional Office and any field offices;

- Pay attention to the newest WMO priority areas (see Executive Council and Congress reports);
- Stay abreast of the education and training needs expressed by the individual WMO technical commissions, including the development of competency frameworks;
- Monitor the scientific and technical developments in your own RTC and/or NMHS and those appearing in WMO publications and reports;
- Seek opportunities to network with the NHMSs, RTCs and other stakeholders in the countries of your region through mechanisms such as the national ETR Focal Points;
- Coordinate and communicate with the other RTCs in your region via the RTC email group for your region;
- Communicate with the individual Permanent Representatives of the countries in your region about their highest-priority training needs;
- Pay attention to the outcomes of the meetings of your regional association and, if possible, have a representative attend the meetings;
- Establish and maintain contact with the ETR Focal Point(s) of your regional association;
- Have regular communication with the national ministries that oversee the NMHSs in your region;
- Ask current or former course participants with whom you come into contact about their specific needs and glean information about learning needs from pre- and post-course questionnaires;
- Establish bilateral agreements with countries in your region that create avenues for ongoing communication;
- Seek out the education and training needs expressed by other international associations and professional groups (such as Climate Outlook Forums);
- Seek specific information on the education and training needs of your regional NMHSs, possibly through surveys or forums (see the appendix to this Guide for some suggested questions).
- Provide promotional posters and other information for display at regional association sessions and events such as Regional Climate Outlook Forums;
- Collect data on training requests, particularly those that are unmet.

3.4.4 Turning learning needs into learning outcomes

Once the regional association and the RTC have agreed on the prioritized learning needs for the regional association or any subregions, the RTC will need to downscale what will likely be very high-level needs to more specific needs that education and training interventions can address.

Having identified the high-level learning needs, it is important to try to specify these in terms of top-level learning outcomes (also referred to as learning objectives) which identify what the learners need to be able to do (rather than just know). Going through that process will help ensure a clear understanding about the nature of the learning needs.

After the top-level learning outcomes have been specified, the RTC will need to produce more detailed learning outcomes that can be used as a basis for designing the training course. *Guidelines for Trainers,* chapter 4, provides guidance about the preparation of learning outcomes and the techniques that can be used to identify learning needs.

Just specifying the learning outcomes can give a rather dull description of what is required. Consequently, it is desirable to put these learning outcomes into context by stating the overall purpose or intent in broad terms – this is referred to as the "aim". Typically an aim includes verbs such as learn, know, understand or appreciate. Unlike learning outcomes, the achievement of aims might be difficult to assess, so stating the aim alone is insufficient. An example of an aim for a course and the accompanying learning outcomes are given in Box 3.5.

Note that the competencies developed by the technical commissions can be used as a basis for describing the learning outcomes that are required to meet a learning need.

Box 3.5. Aim and learning outcomes for an initial course for aeronautical forecasters

Aim: To equip the attendee with the skills and knowledge required to take up a post as forecaster under supervision.

Learning outcomes. After completing this course the attendee will be able to:

- Make weather reports to the standard necessary to ensure the safety of aircraft;
- Meet the mandatory minimum standards of theoretical knowledge for aeronautical observers required by ICAO/WMO/CAA policy;
- Demonstrate an acceptable level of knowledge of meteorological theory for the area/airspace of responsibility of the employing agency;
- Use guidance effectively as the basis of the forecast;
- Interpret actual and forecast data correctly and identify the most relevant data for any given situation;
- Forecast the weather in line with the guidance and other relevant data;
- Present products to an acceptable standard and in the style required by customers;
- Monitor the latest data, amending forecasts and issuing warnings when appropriate.

3.5 DETERMINING LEARNING SOLUTIONS

3.5.1 Types of learning solution

Learning solutions tend to fall into three broad categories: informal, semi-formal and formal learning:

Informal learning: Learning embedded in activities not explicitly designated as a learning opportunity so that there are no specified learning outcomes. This type of learning is unstructured and is acquired by interacting with colleagues, performing tasks and through self-study. Trainers, coaches or mentors are not actively involved;

Semi-formal learning: Learning associated with ongoing activities, with learning outcomes and interactions designed to encourage and support learning that might go beyond the specified outcomes. Trainers are not usually actively involved, but coaches or mentors might contribute;

Formal learning: Learning based on a structured programme of study that is explicitly designated as learning and has well-defined learning outcomes. The learning is acquired through, for example, participation in courses and workshops. Formal learning is usually trainer-led.

Normally RTCs will focus on formal learning. Increasingly, however, RTCs are being encouraged to support semi-formal learning (for example, post-course coaching) and informal learning (for example, pre-course self-study). Research suggests that formal learning may be less important than other forms of learning over an individual's working life. Thus semi-formal and informal learning need to be encouraged and supported whenever possible. For more information about semi-formal and informal learning see *Guidelines for Trainers*, sections 5.4 and 5.5.

In addition to having a clear understanding of the intended learning outcomes, an RTC needs to consider other aspects when choosing a learning solution:

– Are the resources available to deliver the learning activities?

– What restrictions are there on people being released?

– Who will fund the learning activities (if payment is needed)?

– Is another RTC or training institution delivering activities that would address the needs of clients?

– How critical for the client is it to meet the learning needs quickly and effectively?

– What are the characteristics of the learners (for example, their number, geographical distribution, language, age, culture and educational background)?

– Are any pre- and post-course learning opportunities required?

– Is assessment required and, if so, for what purpose?

– How will the success of the learning solution be evaluated and what evidence of successful learning is required?

3.5.2 Types of formal learning

Traditionally, formal learning refers to what occurs in a classroom with a trainer, though this can include, besides lectures, activities such as exercises, case studies, simulations, practicals and projects. Nowadays, distance learning is widely accepted as a mode of formal learning. Rather than classroom versus distance learning, a more useful distinction is between trainer-led (in the classroom or at a distance) and self-paced or self-directed learning.

Information about various kinds of formal learning can be found in *Guidelines for Trainers,* section 5.3. Four types of formal learning: classroom courses, distance learning, blended learning and on-the-job training, are outlined below.

A **classroom (face-to-face) course** at an RTC typically develops the skills or knowledge of a group of people with similar learning needs. This is an efficient way of using resources when the learning needs a lot of interaction, or the number of learners is too small to offset the cost of online development. However, with this approach it is harder to deal with a range of prior knowledge and skills, and ensure that the pace of learning suits everyone. Classroom learning is effective for complex or intimidating content that requires significant discussion, confidence-building and feedback for those new to a discipline, or for developing a sense of community among learners.

In **distance learning** the learners can be far from the trainer. There are two modes of distance learning: synchronous and asynchronous (see Box 3.6). Both types of distance learning can be cost-effective, especially if the learning resources are already available and relevant to the learning needs. Recent forms of distance learning provide substantial opportunities to ask questions, receive feedback and learn from other learners. Increasingly, RTCs have the expertise and resources to develop and use distance learning to supplement or replace more traditional forms of training.

Box 3.6. Synchronous and asynchronous distance learning

Both synchronous and asynchronous distance learning can be effective if the approach suits the learning outcomes and the activities are well designed.

Synchronous: All learners are involved at the same time, even though they are far from each other. It uses technologies such as webcasts, videoconferencing and educational TV. Trainers and learners can interact using web-based technologies such as text-chat, SMS, or forms of instant messaging.

Asynchronous: Learners access the material at their own pace, although a lot of communication can take place via discussion forums, email, wiki, collaborative documents and other tools. A wide variety of resources can also be used such as web-based documents, multimedia and DVDs. Many universities offer degree and continuous education programmes via asynchronous distance learning. Massive open online courses (MOOCs) are a growing form of asynchronous distance learning being offered (see, for example, Future Learn).

Boxes 4.5 and 4.6 provide examples of synchronous and asynchronous learning tools.

Classroom courses and distance learning can be equally effective when well designed, but some learners prefer and thrive on the face-to-face interactions with trainers and fellow learners, while others prefer the flexibility of distance learning. Consequently, RTCs might use **blended learning** that combines some of the advantages of distance learning and face-to-face courses. For example, the distance-learning component could be trainer-led, self-paced or collaborative and synchronous or asynchronous, and could occur at any point in the course (at the beginning, end or periodically). These sessions could involve assignments, readings or online activities that supplement traditional classroom courses. Classroom sessions might be devoted to practical exercises, highly interactive discussions or simulations that require more trainer attention and feedback.

Structured **on-the-job training** in the workplace uses the tools and facilities that are part of the job. Expertise is normally acquired through experience or instruction from a supervisor or more knowledgeable colleague who can provide advice and support. This type of training is particularly effective at developing skills and influencing behaviour. Usually, on-the-job training is aimed at specific learning outcomes that have to be satisfied before an individual is considered to be competent to work independently. Although RTCs should be aware of the value of on-the-job training, it is likely that organizing such an activity will fall outside their remit.

3.6 DEVELOPING LEARNING ACTIVITIES

3.6.1 Workplace learners

Trainers at RTCs should be aware of the characteristics of workplace learners (that is individuals involved in work-related learning) when designing and delivering training. Such learners are motivated when they know the reason for learning and when the subject relates to their jobs. They also like to be actively involved in the learning process, have some control over it, feel that it uses or relates to their experience, and have their contributions acknowledged and respected. For any group of learners, trainers should allow for differences in intellectual ability, background knowledge, expertise, language and preferred pace of learning.

Learners attending a university course that is part of an RTC might not be thought of as workplace learners. However, their characteristics are similar, so those factors need to be taken into account in the design and delivery of a university course.

A learning activity at an RTC, especially one with a strong vocational element, should be designed so that it:

- Uses the experience and expertise of the learners, and encourages cooperation and participation;
- Lets learners have some control over the pace of learning and provides prompt feedback and opportunities for reflection;
- Has clearly defined learning outcomes that are shared with the learners;
- Focuses on how new knowledge and skills can be developed, emphasizing application rather than theory;
- Uses a variety of learning materials and methods.

Adults can be anxious about their learning because they want to appear already competent. Also, they might feel uncomfortable with new technology, might have concerns about whether they will be able to contribute meaningfully, or might feel uneasy about assessment. They might also have difficulty adapting to a non-traditional approach, or simply be out of practice as learners. The design and delivery of training should take these issues into account, especially for RTCs that have learners from different backgrounds in unfamiliar surroundings.

3.6.2 The cultural dimension

Trainers at RTCs need to recognize the cultural differences between learners from different countries and ethnic groups. Trainers should also be aware of their own cultural sensitivities and how they might affect others. This is particularly true for courses involving men and women – the attitudes and beliefs of the trainers could negatively impact one gender or the other in subtle but powerful ways.

Cultural differences might manifest themselves in terms of observed behaviours (for example, language or dress) or values. One way of understanding these differences is to use the framework of cultural dimensions developed by Geert Hofstede (2001)[2] (see Box 3.7). When trainers at an RTC interact with learners from different countries, it is not practical to assess the cultural

Box 3.7. Cultural dimensions

Geert Hofstede proposed that cultures could be assessed in terms of five cultural dimensions:

Power distance: The extent to which there is tolerance of an unequal distribution of wealth;

Individualism versus collectivism: The extent to which emphasis is put on individual achievements and rights compared with those of the group or community;

Uncertainty avoidance: The extent to which uncertainty is minimized compared with a willingness to take risks and accept change;

Masculinity versus femininity: The extent to which there are differences in the roles of males and females;

Long-term versus short-term orientation: The extent to which emphasis is put on the future compared with the past and present.

There has been some criticism of the analysis on which the framework is based because it does not take account of ethnic groups within a nation and cultures not necessarily bound by national boundaries. Patrick Parrish and Jennifer Linder-VanBerschot expanded upon Hofstede's work to include dimensions identified by other researchers (see Parrish, P. and J. A. Linder-VanBerschot, 2010: Cultural dimensions of learning: Addressing the challenges of multicultural instruction. *The International Review of Research in Open and Distributed Learning*, 11(2):1–19).

[2] Hofstede, G., 2001: *Culture's Consequences: Comparing Values, Behaviors, Institutions and Organizations across Nations*. Thousand Oaks (USA), Sage Publications.

dimensions of each country in detail. But it is worth being aware that cultural dimensions may affect how much learners benefit from the learning activities and how they interact with trainers and other learners.

3.6.3 Instructional strategies

Much has been written about the variety of ways a person can learn and whether people have inherent strengths and weaknesses that lead them to prefer one style of learning over another. However, no model of learning styles is universally accepted. Indeed, it has been suggested that there is little evidence to support the need for significant efforts to accommodate learning styles, and that learning styles provide a framework for the preferred method of accessing information rather than the learning process. The emphasis should be, therefore, on using instructional strategies that offer a variety of engaging experiences and suit the subject matter. *Guidelines for Trainers*, section 6.4, describes a hierarchy of learning goals with a related set of instructional strategies.

Active learning strategies can be categorized in the following way:

Discussion strategies: Learners engage in discussions centred on content, or issues encourage learners to engage in critical thinking by using what they are learning to probe the content more deeply, offer potential answers, share their perspectives, or argue a position;

Inquiry strategies: Learners use some form of research to gather data or information and analyse it, and use it to propose a solution to a problem or an explanation of a phenomenon;

Case-based strategies: Learners study and interact with cases that represent real-world situations, which demonstrate how the learning content can be applied or how problems are approached and resolved;

Experiential learning strategies: Learners engage in real-world activities, perhaps in a job context or as part of a field trip, that require them to apply knowledge and skills in performing complex tasks;

Some of these strategies can be used either for a large group or for a set of smaller groups.

Another way of categorizing learning strategies is to differentiate between trainer-centred and learner-centred instruction.

Trainer-centred: The trainer provides information to the learners whilst controlling the pace and content of what is being presented. The learners have a passive role: they are expected to accept what has been presented and take full responsibility for their own learning;

Learner-centred: As well as providing information, the trainer plays a supportive role in helping learners build the required knowledge and skills, and develop their conceptual understanding, through active learning approaches. The learning process is treated as a joint responsibility between the trainer and learners.

With a learner-centred approach, the trainer acts as a facilitator of learning activities in addition to a source of knowledge. This might include solving problems, active discussions and brainstorming, or collaborative problem solving and projects. In general, the learner-centred approach is more effective, particularly when dealing with complex content and skills. However, at times, using a trainer-centred approach to quickly explain content can be of value. At an RTC both approaches will likely be used, with the choice of approach depending on the characteristics of the learners and the learning outcomes.

3.6.4 Planning learning sessions

The design of any learning session at an RTC starts by considering the learning outcomes and how they will be assessed. *Guidelines for Trainers*, section 6.6, includes some of the questions that trainers should consider before deciding on the best means of delivery. Trainers should also consider the following options:

– Sequencing learning activities so that they start with simple or familiar material, then move on to more advanced and newer material in a logical way that draws on previous knowledge, establishes interconnections and gradually builds complexity;

– Taking a spiral approach in which the broadest concepts or principles are covered first, then are reconsidered multiple times as details and complications are added;

– For learning complex procedures, teaching a simpler version of the whole task first, and then gradually adding complexity and variables.

These options are described in more detail in *Guidelines for Trainers*, sections 6.7, 6.8 and 6.9.

Trainers should try to incorporate several learning methods when planning a training session, but care should be taken to avoid using so many different methods that learners become confused. Learning is also enhanced when the activities chosen require the active participation of learners, but this participation has to be integral to the activity rather than an accessory.

When planning learning sessions, it is worth taking into account the Nine Events of Instruction and the First Principles of Instruction. These are described in *Guidelines for Trainers*, section 6.10.

Presentation slides are generally used to illustrate the topic being covered. However, poorly designed material can inhibit learning. For example, too many words or words that do not reflect what is being said will compete with the spoken content. Also poorly laid out slides can be hard to decipher or confusing. For design principles that can be applied to make slides visually appealing and to support effective learning, see *Guidelines for Trainers*, section 6.13. These principles, which are also emphasized in *Guidelines for Trainers,* sections 6.15 and 6.16, can be applied to handouts and other reference material, and to self-paced learning resources.

3.7 DELIVERING TRAINING

Delivering training is the culmination of much thought and effort underpinned by careful planning. For success, trainers at an RTC need to ensure not only that the activities and resources they have designed are good, but that the learning environment is conducive to learning. An effective learning environment can be established by:

– Creating a relaxing and non-threatening atmosphere;

– Using collaborative activities to make learning meaningful and memorable;

– Appealing to multiple senses to aid stimulation and retention.

3.7.1 Joining instructions and facilities

Before an event at an RTC, learners should know the event's aims and key learning outcomes. Even if this information was provided when the learning event was advertised, it is worth including it with the joining instructions because the application to attend might have been made a long time before the course starts. Comprehensive joining instructions are particularly important for an RTC where learners with a variety of backgrounds and previous experiences are coming to an unfamiliar place. Guidance about what could be included for classroom and distance-learning events can be found in *Guidelines for Trainers*, section 7.2.

At an RTC, it is important to create an environment in which learners from many parts of the world want to learn and can interact in desired ways. Consequently, for a classroom-based event, the room should be set out in a way that supports and encourages the required interaction among learners and between trainers and learners. There are many ways in which a room can be set out depending on whether it is for large-group discussions, small-group activities or lectures, though being able to choose the layout does depend on an RTC having flexibility in the use of furniture. For a distance-learning event, the central course website is the equivalent of the classroom, and the way the website is organized and the resources it contains will be strong determining factors in the success of the course. The organization of the website should guide the learner and provide all the required resources.

Guidelines for Trainers, sections 7.3, 7.4 and 7.5, provide advice about the facilities required to create a good learning environment and how to begin a learning event.

3.7.2 Trainers

The behaviour and personal qualities of the trainers at an RTC can have a profound effect on the learning environment.

As well as having a full understanding of the knowledge and skills that are being developed, RTC trainers need to have the training expertise to support learners in achieving the required learning outcomes. They should also have the ability to develop a strong sense of community amongst learners; some ways of doing this are given in Box 3.8. Overall, trainers should behave in such a way that learners have confidence that what is being presented by the trainers is authoritative and relevant to achieving the required learning outcomes.

Box 3.8. How to develop a strong sense of community amongst learners

- Giving each learner opportunities to speak and share ideas. As some learners may be hesitant to speak in a large group, use of small groups within a larger class setting can help address this and allow all learners to share ideas and reactions;
- Using learning activities that require cooperation and collaboration;
- Creating opportunities for non-instructional interactions such as sharing personal hobbies and stories, sports events, meals together and job experiences. For distant learners, this can be done in a non-instructional discussion forum;
- Fostering high-quality discussions, either in class or online. These should be moderated to encourage deep thinking by all participants and ensure that exchanges respect or allow differing views;
- Assigning projects that require long-term collaboration, which can develop stronger supportive relationships;
- Asking learners to give presentations to the entire group. These can be based on project reports or a topic of interest;
- Creating a social networking site and encouraging participation and sharing.

Some learners at an RTC will require assistance in overcoming barriers to success caused by, for example, lack of prior knowledge or motivation, or difficulty in working in a group or engaging in self-learning. Trainers need to be aware of these barriers and support learners by providing motivation, fostering confidence and helping them develop good learning habits, whilst taking into account differences in culture and language. Sometimes the trainer might need to provide individual coaching or facilitation.

The role the trainer assumes will determine the choice of the primary delivery mode. There are three main roles: lecturing, training and facilitating (see *Guidelines for Trainers*, section 7.6). The

role chosen determines the level of engagement and participation of the learners. During a particular learning event, a trainer can take on all three roles at various times, and the delivery mode could move from lecture to training to self-directed learning within the same session.

3.7.3 Presentations and exercises

Presentations are effective only if the learners at an RTC become engaged. This is done by ensuring that what is being delivered is authentic, relevant and non-threatening. In addition to following the good presentation practices referred to in section 3.6.4, learning is enhanced by:

– Presenting material logically;

– Setting out the context of what is going to be covered;

– Making connections with existing knowledge or topics covered in other parts of the training programme;

– Encouraging involvement and participation.

The trainer supports engagement by having a positive and enthusiastic attitude, open demeanour and a willingness to interact with the learners. Even things as simple as maintaining eye contact and speaking in a conversational manner can be critical to successfully engaging learners and encouraging them to think about what they are being told.

For any exercise used at an RTC the learners need to:

– Understand the purpose of the exercise and how it addresses the learning outcomes;

– Receive clear instructions about how to carry out the exercise, the time available and what they are expected to have produced or achieved at the end;

– Have the materials and equipment to carry out the exercise.

See *Guidelines for Trainers,* sections 7.7 and 7.8 for additional guidance about presentations and exercises.

3.7.4 Listening, questioning, giving feedback and dealing with conflict

Trainers at Regional Training Centres should consider the interactions with learners, rather than the presentation of information, as the key to effective training. Even quality self-paced distance learning should generate a form of dialogue through the use of questions and exercises with feedback.

Hearing (using the senses) and listening (using the mind) are not the same. Active listening can be demonstrated by:

– Using a positive facial expression (for example, nodding and smiling), having good eye contact (though not in all cultures) and avoiding distracting mannerisms;

– Using confirming statements, paraphrasing what has been said and asking if your understanding is correct;

– Being patient;

– Taking action in response to what has been said.

Questioning skills are as important as active listening skills. There are three basic types of questions: open questions ("what", "how" or "why"), probing questions (“tell me more

about…", "why was that" or "what then") and closed questions ("when", "where", "who" or "how many"). Often all three types would be used in a learning session. Good use of questions can promote learning and take advantage of what learners already know. However, it might be that some learners attending the RTC are reluctant to answer questions because they are concerned about their lack of knowledge or language skills. This can be overcome by the trainer encouraging more active engagement in a sensitive and non-threatening way.

Usually, providing immediate feedback enhances learning. It is particularly useful for developing skills and changing behaviour (see *Guidelines for Trainers,* section 7.10, for an approach to giving feedback described as BOOST: Balanced, Observed, Objective, Specific, Timely).

During the learning event, conflict or disruptive behaviour can arise, indicated by strongly voiced disagreement, body language, disengagement or lack of respect. The trainer needs to recognize that there is a problem and do something about it. Holding different views is not unusual or unreasonable, especially in an RTC where there is a diverse set of learners, but everyone will benefit from resolving disruptive differences in a way that everyone finds acceptable. More information on dealing with conflict is given in *Guidelines for Trainers,* section 7.11.

3.7.5 Helping learners remember what they are supposed to learn

Memory is an essential part of learning as it allows the learner to store and retrieve learnt information. Learning and memory are complementary: memory depends on learning but learning is enhanced by using information in the memory to provide a framework for acquiring new knowledge.

There are three types of memory:

Sensory memory: A copy of what is seen or heard (visual and auditory) is retained for a very short period (less than a second). It has an extremely large capacity;

Short-term memory: A record of events involving a small amount of information is held in a readily available state for a short period (seconds to minutes). It has very limited capacity;

Long-term memory: Relatively permanent and extensive information is stored on the basis of meaning and importance. It retains knowledge and skills that have been learned and appears to have nearly unlimited capacity.

For learning to take place, information needs to pass from sensory memory through short-term memory to long-term memory. At an RTC this process can be enhanced by:

- Holding the attention of the learner, especially when making key points;
- Putting new knowledge into context (for example, providing the "big picture" or explaining why the new knowledge is important);
- Being active and doing something authentic with the new knowledge (for example. applying it to a work-related issue, answering questions or using exercises);
- Repeating (for example, recapping information by either the trainer or learner) and reinforcing (for example, providing access to material in a different form) what has been covered;
- Connecting new knowledge with what the learners already know;
- Having a clear start and end of a learning session.

3.8 MONITORING AND EVALUATING LEARNING ACTIVITIES

3.8.1 Basic concepts

Assessment and evaluation tend to overlap. In the context of WMO competency framework, these terms mean the following:

Assessment: Measuring what individuals have learnt from an activity – for example, by testing a learner's knowledge, skill or behaviour – or determining current knowledge or competency. The assessment should be based on the objectives of the learning or the job requirements;

Evaluation: Measuring the worth of a learning opportunity – for example, by judging whether the learning opportunity met its objectives, made a difference to the organization or was good value for money – with the aim of improving the learning process for next time.

Assessments at an RTC can be used for a variety of purposes, including recruitment, identifying learning needs, guiding and directing learning that is in progress (formative assessment), performance management and certifying competency. It is important that any assessment process is both reliable and valid (see Box 3.9).

Box 3.9. Reliability and validity

Reliability: The extent to which an assessment process yields consistent results each time it is used in similar circumstances.

Validity: The extent to which an assessment process measures what it claims to measure. Internal validation is concerned with assessing whether learners have met the required learning outcomes; external validation determines whether the learning outcomes were based on an accurate assessment of the learning needs.

Evaluation is an important part of the learning cycle. Its purposes are:

Proving: Demonstrating to stakeholders that positive outcomes have been achieved;

Improving: Identifying how training processes can be improved;

Learning: Providing feedback to support individual learning;

Controlling: Ensuring that training is being delivered according to agreed procedures and requirements.

More information about the purpose of assessment and evaluation and what follows in the remainder of section 3.8 is given in *Guidelines for Trainers,* chapter 8.

3.8.2 Kirkpatrick model

A widely used approach to evaluation is the Kirkpatrick model which proposes four levels of evaluation:

Level 1: Reaction - Are learners satisfied with the learning activities?

Level 2: Learning - Have the required changes in knowledge, skills and behaviour been achieved?

Level 3: Transfer - Have the knowledge, skills and behaviour acquired through the learning activities improved job performance?

Level 4: Results - Has the learning had an impact on the performance of the organization?

There are standard techniques available for obtaining information about levels 1 and 2:

Level 1: Reaction questionnaires which provide the views of the learners about the course content, skill of the trainer, facilities and domestic arrangements, and administrative arrangements;

Level 2: Tests to assess the level of knowledge acquired, and exercises to assess the acquisition of skills.

These are described in detail in *Guidelines for Trainers,* section 8.3. Regional Training Centres usually have a process in place to assess both reaction and learning.

3.8.3 Transfer and results

Just because something has been learnt it does not mean that it will improve performance on the job. Consequently, it is beneficial to assess whether learning is being put into practice, though this will probably fall outside the remit of some RTCs. The basic ways of assessing the impact of a learning activity on job performance are outlined in Box 3.10.

Box 3.10. Methods for assessing the impact of a learning activity on job performance

Direct observation, which could be carried out by the line manager or an external assessor, preferably using a structured form to record evidence. The assessment could be treated as part of the normal performance management process.

Questionnaires, which could be completed by the learner, the learner's manager or both. They could contain questions about the application on the job of the newly acquired knowledge, skills and behaviour, and related issues. Questionnaires could be part of an organization's routine performance management process.

Checklists or action plans, which are used by the learner and/or line manager to record the use made of what has been learnt.

Interviews, which would normally be face-to-face or over the telephone, with someone from training conducting the interview and recording the results. Learners, managers and anyone having direct knowledge of the impact of training on an individual's performance could be interviewed.

Post-course learning activities, which could take a variety of forms. For example, refresher online seminars during which impacts on job performance are shared, or implementation progress reports required of learners as extension of their learning activities.

Assessing whether training activities have had a beneficial impact on an organization is desirable, but in reality difficult to do because usually it is not possible to isolate the impact of the overall training programme or a specific part of that programme. However, whilst this is difficult, it is extremely important for RTCs to attempt to determine how transferable the learning undertaken at their institutes has been in the workplace of the foreign learners. This is a critical element in setting the reputation and brand of the individual RTC and RTC network as a whole.

Regional Training Centres are encouraged to regularly communicate with their key client countries to identify how successful the RTC learning activities have been at helping the client NMHS address its needs. This allows critical feedback to be provided in a controlled manner and can help promote the rigour and strength of the RTC. It also provides a direct marketing approach for future courses.

3.8.4 Evaluating a learning event: essential steps

Evaluating a learning event at an RTC is worthwhile, though it can be a time-consuming activity. However, taking a structured approach to the process, as described below, can help ensure that the effort is worthwhile; it provides sound basis for decision-making:

Clarify the purpose of the evaluation: Ensure that the person commissioning the evaluation and those carrying it out agree on its purpose and the deliverables (for example, what key decisions could be made on the basis of the evaluation). Also identify all stakeholders in the evaluation and their needs;

Plan the approach: Decide what resources are available to do the evaluation, what data are required and how to obtain and analyse the data;

Consider the demands on others: Ensure that the size and scope of the evaluation match the learning activities, and that it places reasonable demands on respondents and those analysing the information;

Test the arrangements: Check the evaluation before rolling it out. A small evaluation might need just someone to check whether a questionnaire is logical and understandable. This should entail the completion of the questionnaire rather than just reading it – sometimes the questions may imply something different from what was actually intended. For a more wide-ranging evaluation, it may be necessary to pilot the whole process;

Implement the evaluation: Carry it out, monitoring whether there are any problems and adjusting it as required. Do not draw early conclusions and take care with sensitive data;

Analyse and interpret the data: Use the data collected to answer the original question;

Prepare a report: Use the analysis to prepare a report that covers the scope and purpose of the evaluation, the methods used, findings and recommendations;

Provide feedback: Give feedback about the outcome of the evaluation to all those who have contributed to it.

Ideally an evaluation should be built into the design of a learning event rather than treated as an add-on. An evaluation is only worthwhile if there is commitment to act on its findings. Otherwise the cost of the evaluation will outweigh its benefits.

3.8.5 Evaluating a learning event: the process

Here is an example of the sequence that could be followed to identify ways in which learning events could be improved and to ensure that action is then taken. It is also necessary to identify responsibilities and how these fit into the RTC's management structure.

1. End of the learning event (or after each major section, unit or module)

- Survey the reaction of the participants;
- Identify possible improvements.

2. Immediately after the learning event

- Prepare a course report which could include:
  - Evaluation against course objectives/learning outcomes;
  - Discussion of key issues;

  - Assessment of any changes to be made to the learning event;
  - Recommendations and suggestions about how they could be implemented.

- Prepare a course development plan which could include:
  - Specific actions and deadlines which build upon the recommendations and suggestions of the course report;
  - Allocation of responsibilities and identification of resources.

3. Several months after the learning event

- Contact participants and their managers to get feedback about how the learning event has affected job performance;
- Update recommendations and the course development plan.

Box 3.11 outlines the process used at an RTC to evaluate the quality of its courses.

Box 3.11. Evaluation of training at a component of the Regional Training Centre in China

The Nanjing University of Information Science and Technology (NUIST), a component of the RTC in China, has an evaluation system for international training courses to assure the quality of what is provided. In this brief description, participants in NUIST courses are referred to as students.

There are three major stakeholder groups for the training courses attended by international students: the training centre, training course sponsors (WMO, the China Meteorological Administration, the Ministry of Commerce of China, NUIST, and related NMHSs or student affiliations) and students.

The evaluation by the training centre is a self-assessment of its organization and management of training courses, while the training sponsors' evaluation is a third-party assessment, including feedback information from relevant institutions in the students' home countries. The students' evaluation gives the training centre feedback on how to improve the training process, administration, facilities and logistic arrangements.

The methods used for the evaluation include questionnaires, knowledge review, observation and interviews, with questionnaire being the most common approach:

General evaluation: An anonymous questionnaire is usually distributed to students after completion of a course. The questionnaire focuses on the quality of training and overall management of the training course;

Evaluation of teaching quality: The training centre uses the results of the questionnaire to provide feedback to the lecturers so that they can improve their teaching. Usually more than 80% of the questionnaires are returned;

Interviews with students: Interviews are conducted with representative students to obtain feedback on the quality of training. The students are asked questions about the effectiveness of the course and whether the knowledge and skills provided was helpful and practical. In addition, they have an opportunity to provide comments and suggestions about the course;

Follow-up of the training quality evaluation: The students' evaluation of the training course, focussing on facilities, accommodation, lecturers and administration, is usually presented to the training centre during the course. Contact is maintained with the students through e-mail for post-course follow-up.

3.8.6 Evaluating a training institution

Sometimes it might be necessary to evaluate a training institution to determine whether the benefits provided by the institution outweigh the costs. This could be addressed by using a cost/benefit analysis or an investment appraisal which depend on:

– The cost of running the institution – for example, staff and facilities;

– The benefits in monetary terms of the training department/institute – for example, cost savings, increase in productivity and increased income generation;

– The cost/benefit of the potential replacement option(s).

Usually the costs are relatively easy to identify, but putting the benefits in monetary terms is more difficult and inevitably subjective.

An alternative approach is to use benchmarking based on a comparison of costs and benefits of the training institution with those of another organization (see *Guidelines for Trainers,* section 8.5).

3.9 THINGS TO CONSIDER

To help you consolidate the material presented in this chapter or check your understanding, try answering the following questions.

Regional learning needs

– Where would you look to find out what the regional association has identified as its education and training needs?

– How does your RTC identify the regional or subregional learning needs?

– How often are the learning needs reviewed?

– What could your RTC do to assist in clarifying the learning needs in the region?

– What can you do to increase the number of countries supported by your RTC?

Determining learning solutions

– Who in your RTC helps to develop the learning solutions for the identified regional needs?

– What learning solutions does your RTC use when addressing regional issues?

Developing learning activities and resources

What alternative or additional learning opportunities might be undertaken?

Delivering training

How will your RTC's use of distance learning change over the next five years to meet regional training needs?

Monitoring and evaluating learning activities

How does your RTC evaluate its international training and to whom does it report the outcomes?

4. MANAGING LEARNING RESOURCES AND FACILITIES

This chapter provides guidance on how the management of learning resources and facilities can support the learning process at an RTC. Initially, consideration is given to the various ways in which quality assurance can be built into the operations of an RTC. Then information is provided about the education and training facilities that are normally found at an RTC and how to build a distance-learning infrastructure. This is followed by consideration of various aspects of financial and people management. The chapter ends with some guidance about policies and procedures that might be of value at an RTC.

4.1 QUALITY ASSURANCE

4.1.1 Quality Management System: ISO 9001

Increasingly, organizations ensure that the quality of their products and services meet the needs of their customers. A standard approach is to have a Quality Management System (QMS) that establishes a framework for an organization to manage its key processes. ISO 9001, published by the International Organization for Standardization (ISO), is a common standard used in QMS implementation and can help both product- and service-oriented organizations to achieve standards of quality that are recognized and respected throughout the world. It is also acceptable to implement a QMS that is not ISO certified.

WMO has established a Quality Management Framework (QMF) concerned with the quality of data, products and services. It builds upon the fundamental principles of the ISO 9000 family of standards and provides a comprehensive system of recommended procedures and practices that should be used by Members in establishing QMSs for the provision of meteorological and hydrological services. The QMF is described in *Technical Regulations* (WMO-No. 49), Volume IV.

Box 4.1. provides a link to a training module, Quality Management Systems: Implementation in Meteorological Services, which has been developed by the COMET Program in collaboration with WMO.

Box 4.1. Implementation of a Quality Management System

Quality Management Systems: Implementation in Meteorological Services is a one-hour online learning module that provides an overview of the key concepts, benefits and principles of an effective QMS based on the ISO 9001:2008 quality management standard. It introduces guidelines for the successful implementation of a QMS in aviation weather service agencies. Although primarily aimed at managers responsible for implementing, monitoring and updating QMS processes, it provides a basic introduction to QMS suitable for all staff.

The first part of the module provides an overview of QMSs, introduces key concepts and describes the benefits of QMS implementation. The second part outlines key steps for successful QMS implementation, including important tips, examples and critical success factors. After registering on the MetEd website, one can access the module by going to https://www.meted.ucar.edu/training_module.php?id=869#.WMu23kbxIxg.

ISO 9001 was initially developed for manufacturing and service industries, but it can also be applied to the provision of education and training. Having a QMS based on ISO 9001 can lead to:

- Improved organizational effectiveness by establishing more efficient and consistent ways of working;

- Increased learner satisfaction by having processes that focus on meeting the needs and expectations of the learners;

- Enhanced motivation and engagement of trainers and learners by setting clear objectives and priorities, and specifying responsibilities;

- Better commitment to continuous improvement in processes and outcomes.

4.1.2 Quality Management System: ISO 29990

Organizations providing training, such as RTCs, might seek further or formal accreditation based on *ISO 29990:2010, Learning services for non-formal education and training – Basic requirements for service providers*. This ISO standard is available in English, French and Russian at http://www.iso.org/standard/53392.html. A training institution that has no national accreditation as a provider of vocational training may be designated as an RTC if it can demonstrate that it carries out its training activities in accordance with ISO 29990. This might appear to be an additional requirement, but in reality this ISO standard covers many of the activities that are already part of the requirements to be designated as an RTC, as shown in Box 4.2.

Box 4.2. Relationship between RTC requirements and the ISO 29990 standard

RTC requirement	ISO 29990 standard
– Identifying learning needs; – Designing the learning service; – Delivering the learning service; – Assessing learning and evaluating the learning service; – Administering and managing the learning service.	– Determining learning needs; – Design of the learning services; – Provision of learning services; – Monitoring the delivery of learning services and evaluation carried out by the learning service provider; – Management of the learning service provider.

ISO 29990 shares similarities with ISO 9000 and provides a generic model for quality professional practice and performance. It also offers a common reference for learning service providers and their clients in the design, development and delivery of non-formal education and training. In this context, non-formal education is considered to be organized educational activity outside formal systems of elementary, secondary and higher education (for example, vocational training, life-long learning and in-company training.

ISO 29990 is divided into two areas:

Learning services: Requirements affecting all aspects of the learning process;

Management at the learning service provider: Requirements ensuring that there is a certifiable management system (this might include, for example, a business plan or systems for managing documentation, financial risk, human resources, communication and allocation of resources).

A university component of an RTC is not required to follow ISO 29990 for its educational activities. However, some of the ISO 29990 requirements could be adopted for those activities, though this would need to be done in a way that is consistent with national academic standards. If the university component is involved in providing vocational training that is not covered by national academic standards and requirements, the ISO 29990 standard should be satisfied for those activities.

Guidelines for Trainers, developed in support of the Competency Requirements for Education and Training Providers, gives an overview of the competencies, as well as background knowledge and skills, required to operate in accordance with ISO 29990.

A key aspect of a QMS is documenting responsibilities and procedures, possibly as part of an operating manual. Box 4.3 shows the content of an operating manual produced by an RTC. The purpose of the manual is to define the operating parameters for all the RTC staff, contract personnel, or any other person or organization utilising the RTC. It also defines what is expected

of the learners and their associated responsibilities and obligations. Though producing an operating manual can be time-consuming, the development process leads to clearer procedures and responsibilities which benefit the overall management of the RTC.

Box 4.3. Contents of an operating manual for the Regional Training Centre in South Africa

The RTC in South Africa is part of the South Africa Weather Service, an ISO 9001 certified organization. The operating manual of the RTC covers the following topics:

1. Reporting structure and functions of the RTC
2. General administration, rules and regulations
3. Learner entry, guidance and support procedure
4. Management of practical training at regional offices (management of on-job training procedures)
5. Management of documentation and records
6. Prerequisites for the different courses
7. Assessment, moderation, certification and reissuing of certificates
8. Management of written assessments (tests and examinations)
9. Recognition of prior learning
10. Learning programme development, provision and review procedures
11. Code of practice on plagiarism

Many of the chapters include the scope, purpose, definitions, responsibilities and procedures associated with the activity being documented.

4.1.3 Certification and accreditation

Certification and accreditation might form part of a QMS. Often certification and accreditation are used interchangeably, but they have different meanings in the context of education and training.

Certification is the process attesting that a person has satisfied a particular academic standard such as a degree or professional qualification, or has the competencies required for a particular job or task.

Accreditation is the process through which an external body evaluates an institution or programme against a specified standard. This is a form of quality assurance.

The two are often linked. For example, an RTC might be accredited to certify that people satisfy a standard. In other words, accreditation indicates that the RTC has the resources and processes to offer certification of individuals.

Many universities and other educational institutions undergo an accreditation process to show that they are approved by the relevant legislative or professional authority. Consequently, a university-based RTC might be automatically accredited through the accreditation of the whole host organization. For an RTC that is a training institution, there is no requirement to be formally accredited, but it should satisfy the WMO requirements to be designated as an RTC and carry out its training activities in accordance with ISO 29990.

Note that WMO is not an accrediting body, so some Members might decide to seek national accreditation of their RTCs if they are not already accredited.

A qualification is often the outcome of a certification process based on one or more assessment processes. The award of a qualification occurs when an authoritative body recognizes that an individual's learning has reached a specified standard of knowledge and skills on the basis of the successful completion of a programme of study. An RTC providing qualifications must have robust assessment processes in place to ensure that those acquiring the qualifications have met the required standard.

4.2 EDUCATION AND TRAINING FACILITIES

An RTC requires the standard office systems as well as specific facilities, hardware and software with efficient internet connectivity for promoting learning.

In addition to rooms for staff, the facilities occupied by an RTC might include:

- One or more classrooms for lectures, private study and exercises;
- Training technologies such as video and data projection systems, internet access, web server access for hosting a website, computer laboratories, black/white and smart boards, learner response systems ("clickers"), and video or web conferencing systems;
- Weather forecast simulator rooms with access to observations and forecasts;
- Libraries, meeting rooms and other facilities in accordance with local policies and procedures;
- Printing and photocopying facilities, storage for teaching and learning resources, and physical or electronic filing systems;
- Amenities such as bathrooms/toilets, kitchens and locker rooms;
- Recreational facilities;
- Residential facilities including cafeteria and laundry.

To enhance learning related to specific tasks and roles, an RTC should have access to the same equipment that is used in real-time operations. This equipment might include:

- Surface and upper-air instruments and radars;
- Maintenance facilities and communication and calibration equipment;
- Forecasting workstations and observing equipment;
- Computer laboratories.

RTCs might use equipment within an operational facility, or the equipment might be located in a dedicated part of the RTC.

The amount of funding that an RTC can use might be under its direct control. However, if the RTC is part of a larger organization (such as an NMHS), the funding might mainly be determined by that organization.

The senior management of an RTC will need to be able to justify investment in infrastructure through ongoing evaluation of their programmes and careful monitoring of the amount and type of technology used. The justification is likely to be more persuasive if it is linked to the strategic plan and the RTC's ability to meet regional needs. To maximize the use of technology, RTCs should collaborate and liaise with other RTCs and national institutions to share experiences and resources.

Nearly all aspects of education and training can benefit from making full use of the range of technologies that are available. So RTCs need to ensure that their staff are competent in the use of the available technologies as well as being aware of their limitations.

If the RTC is hosted by an organization, some technologies, such as the Learning Management System (LMS) and workstations providing access to meteorological, hydrological and climatological data, can also support learning throughout that organization. More information about the use of an LMS is provided in Box 4.4 and in *Guidelines for Trainers*, section 3.10.

Box 4.4. Learning Management System

An LMS is software that supports the delivery and management of training resources and events. It can be used for a wide variety of purposes, including managing training records, registering for courses, providing learning resources, delivering on-line courses, facilitating communication between learners and teachers, and assisting in the assessment of learning. Most LMSs are web-based, so they allow access to information from anywhere at any time. However, such systems require support to maintain their integrity, usefulness and currency.

An example of LMS is Moodle. This is an open-source web-based system that is used within WMO to manage and administer meetings and training events. The philosophy behind Moodle is the creation of a collaborative learning environment in which groups communicate and provide information from which everyone can benefit. Having learners provide information for others is a powerful way of enhancing their own learning.

The Moodle environment is flexible and can quickly respond to the needs of particular groups. It can provide resources such as course information, handouts, presentations, video and web links, and can facilitate activities such as discussion forums, assignments, quizzes, wikis and blogs.

Moodle can be thought of as the distance-learning alternative to the physical space of the classroom. For more information about Moodle see https://moodle.org/ and section 5.8.4 of this Guide.

A Virtual Learning Environment (VLE) is similar to an LMS in many ways, but VLEs tend to be used in educational establishments and offer a broader range of capabilities.

4.3 BUILDING A DISTANCE-LEARNING INFRASTRUCTURE

Distance learning can take many forms in terms of structure, tools, technologies and ways to engage the participants. Indeed, the delivery of distance learning can be targeted at personal computers, tablet devices or even mobile phones, or a combination of these depending on the needs of the learners. Deciding which designs to use also requires some planning that will be different from that used for classroom delivery.

4.3.1 Tools for distance learning

The variety and capabilities of the tools available to distance-learning instructors grow each year. This is driven primarily by a desire to make learning environments richer and more interactive, and closer to the potential interactivity of a classroom-based course. Classroom instructors now frequently adopt online distance-learning tools to make their classroom courses more interactive and personalized.

Tools for distance learning can be classified in generic terms as synchronous or asynchronous as shown in Boxes 4.5 and 4.6.

Box 4.5. Synchronous distance-learning tools

Live online sessions are not just convenient and cost-effective, they are becoming a natural form of communication for many teachers and learners. A number of powerful Web-based software applications are available, with a range of prices and features. Free Web applications are also available.

Tools	Uses
Audio conferencing	To conduct presentations and discussions, ask and answer questions and give feedback.
Video conferencing	To personalize sessions (with webcam), show images, animations and presentation slides.
Polling	To allow learners to answer questions immediately to gauge learning.
Chat	To allow learners to ask questions at any time in an unobtrusive way or when bandwidth is poor; to communicate while testing and setting up a session.
Participant list	To provide a list of participants, and to indicate various technical and physical states: audio connected, offline, hand raised to ask a question, agreement, etc.
Icons/Emoticons	Learners click icons to indicate their feelings or understanding (common icons include a smiling face, a confused face, applause, agree/disagree icons)
Application sharing	To share any application open on the computer to expand what can be shown in a session.
Breakout rooms	The trainer can set aside private rooms for small groups discussions.

4.3.2 Effort required from learners and instructors

Distance learning, like face-to-face courses, places heavy demands on learners, including time to view course learning resources, to participate in live course sessions and asynchronous activities, and to complete course assignments and projects. For this reason, learners studying for professional development should be allotted time to dedicate to these tasks or they will not succeed. Short, intensive "virtual" courses might require full-time dedication, but longer-term courses delivered incrementally, in the manner of university courses, might require four to eight hours per week of participation.

Distance-learning instructors will need to dedicate time to a wide range of activities associated with delivering distance learning. These include delivering live presentations, facilitating discussion forums, leading other types of learning activity like case studies or real-time weather discussions, monitoring learner progress, answering questions, preparing and providing feedback on exercises, and assessing what has been learnt. Preparation work can be substantial, including tasks such as planning and developing the course, research on topics, work on presentations, preparing exercises and labs, localization and translation, syllabus preparation and activity development.

4.3.3 Preparing for distance learning

Implementation of distance learning can fail due to poor planning and preparation. Consequently, distance learning requires investments in:

– Staff training in distance-learning methods;

– Purchase of commercial e-learning software applications or researching and testing free online tools;

– Time to learn how to use e-learning tools properly;

– Time to install and set up a course management system, or time to learn how to use such a system hosted by others (for example, WMO);

– Preparing remote support services for learners (technical, logistical and academic);

– Time to determine what kind of distance learning will be most effective;

– Time to develop an implementation and sustainability plan.

This can be a considerable investment but it does provide access to a wealth of distance-learning material that can enhance or replace traditional approaches to training. Such investment might become inevitable at RTCs as young people increasingly turn to the Web as their primary source of information.

Box 4.6. Asynchronous distance-learning tools

Asynchronous tools provide opportunities to collaborate at a distance, time to think and reflect before responding, time to prepare contributions (especially important for learners working in a second language), as well as the freedom to read and contribute whenever there is time – before or after work, or even when travelling. There are free sources of these tools and most are built into course management systems, such as Moodle.

Tools	Uses
Discussion forums	Text-based discussion forums provide instructional dialogue that can lead to clarification and deeper understanding.
Wikis and related tools	Wikis are used to build a resource with the input of a large group, such as a shared document or list of ideas and attributes.
Blogs	Learning blogs (short for weblog) are individual writings from learners or instructors about their learning progress, insights, questions, changes in attitude and other reflections on their learning experience.
Twitter	Micro blogs like Twitter can be used to share short messages, news or reflections quickly.
Collaborative documents	Related to Wikis; learners can collaborate on projects at a distance by using cloud-based development tools like Google Docs.
Social bookmarking	Bookmarking of relevant websites and resources intended to be shared with peers; popular tools include Delicious or Diigo, which can provide open or restricted access.
Video sharing	Video can be shared by instructors or participants through publicly available services like YouTube or Vimeo.
In addition to the tools listed above, distance learning can take advantage of other online and offline media, such as DVDs, print documents, resources designed for mobile devices, and self-paced Web-based learning modules.	

4.4 FINANCIAL MANAGEMENT

4.4.1 Budgeting and financial monitoring

Sound financial management is critical for any organization, including an RTC. The financial framework for an RTC will depend on a variety of factors including national government frameworks, legislation and standards. In some cases, the financial framework of the organization hosting the RTC will be paramount.

For an RTC, it is likely that a financial management framework will include:

– Authority, accountability and reporting arrangements;

– Roles and responsibilities;

– Financial processes (for example, planning and management of financial resources).

The preparation of an annual operating budget (sometimes called a revenue budget) is a key activity as it affects the staffing, equipping and performance of an RTC. However, the way in which an RTC prepares a budget will depend on the extent to which the RTC's internal budgeting process is embedded into wider organizational planning. Box 4.7 indicates the type of items that might be included in the operating budget of an RTC. If an RTC also provides residential facilities, the associated expenditure and income might also be included.

Box 4.7. Possible items in the operating budget of a Regional Training Centre

- Organization overheads;
- Salaries and related staff costs;
- Operational and administrative travel;
- Information and communications technology;
- Furniture and fittings;
- Office supplies;
- Equipment – purchase;
- Equipment – maintenance and repair;
- Translating, copying, printing and binding services;
- Catering, cleaning and security services;
- Expenses of learners;
- Rents and utility services;
- Revenue from provision of services;
- External financial assistance.

An alternative approach is to use activity-based budgeting. This identifies the expected costs of specific activities such as developing materials, delivering training and international endeavours.

Capital expenditure (Capex), usually treated separately from the annual budget, refers to funds used to acquire or upgrade physical assets (for example, building and equipment) that have a useful life beyond the current budget year. Investing in Capex usually results in increased capacity/capability and/or reduced operating costs. In accounting terms, the expenditure is depreciated (amortized) over the expected lifetime of the asset. For some RTCs, it is likely that Capex will be determined by the hosting organization and not appear in the budget of the RTC.

Once a budget has been agreed, an RTC needs processes to monitor financial performance. This allows the comparison of the current situation against the budget to guide decision-making, and gives managers information about performance for which they are accountable. The two key processes for managing the budget of an RTC are:

– Monitoring and reporting current financial performance against the budget on a consistent and regular basis;

– Forecasting the expected financial position against the budget at the end of the year after taking into account all anticipated expenditure to identify and quickly respond to unexpected developments.

4.4.2 Costing learning activities

Sometimes an RTC might need to identify the cost of a particular learning activity. For example, it might be necessary to do this to prepare budgets and plans, benchmark with other organizations or decide whether to invest in new technology. However, the costing of courses of an RTC can be complex as the attribution of costs is often not straightforward.

The costs of learning activities, such as a training course, fall into two broad categories:

– **Development costs**: One-off costs covering the staff time spent on designing the learning methods, materials and evaluation process. The cost of running a pilot learning event is sometimes considered to be a development cost;

– **Delivery costs**: Costs related to running each learning event. They cover the costs of the trainers along with costs associated with facilities, equipment, materials, administration and (if applicable) catering and residential accommodation.

Sometimes the review and update costs are included in the delivery costs but for major changes to existing courses it may be better to treat the associated costs as a separate item.

For semi-formal learning activities, such as coaching provided by a line manager, there are also costs associated with ensuring that line managers are trained as coaches and with allocating time for coaching sessions, including preparation and review.

For e-learning and other technology-based approaches, RTCs need to take into account the cost of buying or designing and maintaining the e-learning system and content.

Some organizations have developed full costing of their training activities that take into account items such as staff time, administrative charges and cost of developing and maintaining training facilities (including, for example, rent and power). There are also issues such as opportunity cost or benefit, which look at the implications of providing this rather than that training course when resources are limited. This is part of risk management and prioritization.

There is also the cost of learners taking part in a learning activity. This is normally taken into account when trying to assess the overall cost of a learning activity.

4.5 PEOPLE MANAGEMENT

4.5.1 Gender equality

WMO is determined to achieve gender equality, empower women and build climate resilient societies. To this end, it is committed to mainstreaming gender in its governance, working structures, programmes and service delivery. It is also determined to attract more women into science and meteorology.

The WMO Gender Equality Policy was adopted by the Seventeenth World Meteorological Congress. Its purpose is to promote, encourage and facilitate gender equality across WMO and to establish a mechanism for measuring progress. Originally formulated in 2007, the Policy was amended in 2015 to (a) incorporate the outcomes of the Conference on the Gender Dimensions of Weather and Climate Services, (b) address gaps identified in the Progress Report on Implementation of the WMO Policy on Gender Mainstreaming, and (c) reflect existing good practice. This also led to the preparation of a WMO Gender Action Plan to invigorate policy implementation.

The Executive Council Advisory Panel of Experts on Gender Mainstreaming is the main body overseeing, advising and reporting on the implementation of gender mainstreaming activities at all levels of WMO. Its terms of reference are given in Box 4.8. The Secretariat assists the Advisory Panel in all its activities, collects data and compiles relevant reports, coordinates gender mainstreaming action across WMO and implements the decisions and recommendations of WMO governing bodies in this area.

In the recruitment, induction and professional development of personnel, RTCs are expected to adopt and implement the WMO Gender Equality Policy. This also applies to the admission process and engagement of RTC staff with learners and others.

For additional information about the Organization's approach to gender equality, go to http://public.wmo.int/en/resources/gender-equality.

Box 4.8. Terms of Reference of the Executive Council Advisory Panel of Experts on Gender Mainstreaming

(1) To oversee, advise and regularly report to the Executive Council on implementation of the WMO Gender Equality Policy and activities of WMO on gender mainstreaming at all levels of the Organization;

(2) To contribute effectively to the efforts of WMO in promoting, encouraging and facilitating gender equality across the Organization, including Members and the Secretariat, in line with the WMO Strategic Plan;

(3) To develop a WMO Gender Equality Action Plan for the seventeenth financial period and advise on its implementation, including specific strategies and activities to ensure gender mainstreaming in all activities of NMHSs, regional associations and technical commissions, specifically in the areas of strategic planning, governance, employment, capacity development, policymaking, provision of gender-sensitive weather, hydrological and climate services, and monitoring and evaluation;

(4) To recommend and support resource mobilization strategies for gender mainstreaming activities at WMO and in NMHSs;

(5) To consider any other matters relating to gender mainstreaming that the Executive Council may deem necessary.

Source: Abridged Final Report with Resolutions of the Sixty-seventh Session of the Executive Council (WMO-No. 1158), Resolution 2 (EC-67)

4.5.2 Recruitment

Recruiting staff with the required expertise is essential for the effective functioning of an RTC. If a vacancy is to be filled, the first step is to carry out a job analysis in terms of the tasks and outputs required. In doing this, it is important to think about both current and future needs. Once there is clarity about the job, it is usual to prepare two documents:

Job description: This indicates the tasks to be carried out and relationships with others in the organization. It might cover the job title, purpose and scope, the position within the organization (reports to and responsible for), duties and responsibilities;

Person specification (sometimes referred to as selection criteria): This indicates the required experience, qualifications and personal qualities. These are often categorized in terms of what is necessary or desirable.

When RTCs recruit trainers, the key considerations will be identifying what meteorological expertise is required and whether teaching experience is necessary or desirable. If teaching experience is not necessary, the recruitment process needs to ensure that anyone selected for the post has the potential to quickly acquire teaching skills.

The way applications are handled will depend upon the RTC's internal processes. The two standard ways of applying for a post are as follows:

Filling in an application form: This provides information in a consistent format and makes it easier to objectively assess an applicant's suitability for the job, though a poorly designed form can make the task rather difficult;

Submitting a CV: This allows the applicants to describe themselves and their background in their own way and to provide letters of recommendation. However, in this way, a lot of irrelevant information might be provided, making it difficult to consistently assess applicants.

Once the applications have been received, it is usual to shortlist the applicants, assess those shortlisted and decide who would be offered the job. The aim of the assessment process should be to determine which applicants have the ability to do the job (that is, those satisfying the person specification) and the potential for further development. As well as an interview, the recruitment process could include other activities (for example, giving a presentation or preparing a lesson plan). During the process, it is desirable that applicants have an opportunity to find out more about the activities of the RTC so that an informed decision is made by both sides.

4.5.3 Induction

A structured induction programme will help new RTC staff become quickly familiar with their jobs and working environment. This will benefit the RTC and increase the new staff members' job satisfaction as they will understand what their jobs entail and how they fit into the RTC structure. Without such a programme, there is the risk that new staff members will suffer from low morale and poor integration into a team.

A good induction process might include an explanation of what the job involves and how it fits into the organizational structure and contributes to the operational and strategic goals of the RTC. In addition, information is usually provided about topics such as operational and development plans, facilities and health and safety. However, care needs to be taken to avoid overwhelming someone by presenting too much information too quickly. To support the induction process, it is worthwhile for an RTC to have a checklist to ensure that a new person receives all the required information.

Sometimes a new trainer at an RTC will have had little previous teaching experience. In this case, the induction programme needs to at least set the foundations for acquiring the required expertise. The first step could be to ensure that the new trainer is fully aware of the training competencies specified in *Guidelines for Trainers*. Other actions could include attendance at a train-the-trainers course (if available through an institution certified by a national vocational education association or through WMO) and providing opportunities for new trainers to watch experienced trainers deliver sessions. During the process of acquiring training expertise, it would be worthwhile for a new trainer to have a mentor from whom he/she could receive advice and feedback.

The length of the induction process will depend on the requirements of the job and the background of the new member of staff. Consequently, an induction process needs to be tailored

to the needs of an individual. Investing time in a tailored induction will help new RTC staff become productive more quickly and make them feel that joining the RTC was the right thing to do.

4.5.4 Continuing professional development

Through continuing professional development (CPD) individuals keep their professional expertise up to date and enhance their capabilities – something that is expected of all professionals. In particular, CPD allows staff to:

– Improve or update their job-related knowledge and skills (for example, scientific or technical and training expertise);

– Acquire new knowledge and skills for a change of job, career progression or taking on more responsibility (for example, management or leadership expertise).

Continuing professional development focuses on the needs of the individual and supports the achievement of career goals. It should help answer the question: Where do I want to get to with my career and what do I need to do to get there? Individuals benefit from CPD in becoming more confident, and by increasing their professional credibility and ability to cope with changes in circumstances (for example, organizational and technological changes). Through CPD, jobs may become more interesting with a corresponding increase in job satisfaction. At the same time, the RTC benefits from CPD by maximizing the potential of its staff, increasing staff morale and motivation, and having an adaptable workforce.

Continuing professional development is not primarily concerned with attending formal training: "things done" or "time spent" are of secondary importance. Instead the emphasis should be on setting objectives for learning and then engaging in opportunities aimed at achieving that learning.

Often organizations expect staff to keep a record of their CPD activities. Then on a regular basis, possibly as part of the annual performance management process, there is the opportunity to use the record to reflect on past learning and plan the future.

The CPD of trainers at an RTC might involve ensuring that their subject-matter expertise is maintained and enhanced, and their training expertise continues to develop.

Subject-matter expertise can be developed, for example, by attending seminars and workshops, using Web-based sources of information and reading books and other scientific literature.

Coaching is often the best way of enhancing training expertise because it is focused on the needs of the individual. In addition, expertise can be developed by participating in train-the-trainer courses and using the *Guidelines for Trainers* and other sources of information such as books and the Internet.

Whatever professional development activities are undertaken, line managers should be involved in determining the learning needs, identifying ways of addressing them and supporting individuals in applying what was learnt.

An RTC will benefit from having a performance management process that establishes a culture in which individuals take responsibility for developing their expertise and feel able to suggest ways of improving the quality of what is provided by the RTC. Encouraging a learning culture and investing in staff development will enable an RTC to make full use of what its workforce can offer.

4.5.5 Performance management system

People are the most important resource within an RTC, so dealing with people in a good way benefits all concerned. Box 4.9 lists some ways in which a supervisor or manager at an RTC can get the best out of staff and learners, though the approach taken will depend upon the culture and expectations of the organization.

Box 4.9. Some ways of getting the best out of people

- Be a good role model by being honest, fair, trustworthy, respectful and approachable;
- Maintain credibility by always doing what you say you are going to do;
- Empower and motivate others by being clear about what is required and showing appreciation for what has been accomplished;
- Arrange team-building activities;
- Give and take feedback in a positive way;
- Take care of important issues and promptly deal with difficult or uncomfortable situations.

Many organizations have a performance management scheme which:

– Encourages individuals to align their activities with the goals and values of the organization;

– Assists in the personal development of individuals.

Sometimes the scheme might also be linked to the remuneration and promotion system. The complexity of a performance management scheme at an RTC will depend upon the nature of the organization hosting the RTC and any national requirements placed on an academic or civil service institution. However, in any scheme, it is important that individuals have a clear understanding of the duties and responsibilities of their job, and of the whole staffing structure and associated line management responsibilities.

Often a performance management scheme requires annual reviews of performance involving individuals and their supervisors. This tends to be based on a set of targets agreed at the beginning of the reporting year. Increasingly, however, the end of year review is complemented by more frequent and informal contact so that there is greater mutual understanding and two-way feedback. Whatever approach is taken, the final assessment at the end of a reporting year should never be a surprise. A performance management scheme will need to be at least partly formal if it is:

– Part of a QMS;

– Tied to job descriptions that detail the duties and responsibilities;

– Linked to targets or work programmes associated with individual or team performance;

– Based on a set of competencies (job specific) or capabilities (usually related to a profession).

4.5.6 Workforce plan

Performance management and CPD activities primarily deal with things as they are, but it is also important to consider the future. This can be achieved by an RTC having a workforce plan, which supports and informs the strategic plan, with the aim of ensuring that the right people are in the right jobs in the right place at the right time.

A workforce plan would compare the current workforce (supply) with what is required in the future (demand) and then identify the actions required to bridge any gaps. Such a plan would need to address three key questions:

– What is the current situation? or Where is the RTC now?

– What are the future requirements? or Where is the RTC heading?

– What is needed to bridge the gap? or How can the RTC get there?

To answer these questions, it is necessary to have good data together with an ability to take into account internal and external drivers and the annual and strategic plans of the host organization (if applicable). One technique for doing this is to carry out a PESTLE analysis described in Box 4.10.

The actions identified in the workforce plan tend to be associated with recruitment, retention and CPD of staff. Often the workforce plan might be developed for the host organization as a whole, rather than specifically for the RTC.

Box 4.10. PESTLE analysis

A PESTLE analysis provides a framework for understanding the broad context in which an RTC operates and encourages strategic thinking. In addition to being used for workforce planning, a PESTLE analysis can support any kind of strategic planning (for example, service development and organizational change). It focuses on the following aspects:

Political: What is happening politically that can affect the activities of an RTC?

Economic: What is happening within the economy that can affect the activities of an RTC?

Sociological: What is occurring socially that can affect the rate of activity of an RTC?

Technological: What is happening to technology that can affect the activities of an RTC?

Legal: What changes to legislation can affect the activities of an RTC?

Environmental: What is happening ecologically and environmentally that can affect the RTC?

4.6 PLANNING AND REPORTING

4.6.1 Planning

Planning plays a key role in sustaining and developing any training institution. This is particularly important for a training institution that has national as well as RTC responsibilities. The plans guide priorities, goals, actions and timescales. As well as giving managers and staff a clear framework to work from, the plans can help secure resources, show that the RTC is responding to changing circumstances and demands, and inform stakeholders about what the RTC can do. A SWOT analysis, summarized in Box 4.11, is a widely used planning tool.

There are many different kinds of plan, but the following are the three most common:

– A strategic plan, which gives a vision of the future and specifies broad goals over a specified period (usually three to five years); this might entail changes to the size, shape, nature and culture of the RTC over that period. The plan usually identifies the major internal and external change factors that will affect the institution. These factors might change so it is important to review them and, if necessary, modify the strategic plan. Some organizations would formally review the plan at least once in its lifetime;

Box 4.11. SWOT analysis for a Regional Training Centre

A SWOT analysis is a planning tool which can be used to identify the strengths, weaknesses, opportunities and threats affecting an RTC, and this in turn supports decision-making and the establishment of strategies:

Strengths: The internal qualities that enable the RTC to accomplish its mission;

Weaknesses: The internal matters that prevent the RTC from accomplishing its mission and achieving its full potential;

Opportunities: Circumstances presented by the external environment that can enhance the way in which an RTC operates;

Threats: The conditions in the external environment that can jeopardize the way in which the RTC operates.

The SWOT analysis can be used to develop a set of strategies.

	Opportunities	Threats
Strengths	Use strengths to maximize opportunities	Use strengths to minimize threats
Weaknesses	Minimize weaknesses by using opportunities	Minimize weaknesses to avoid threats

A SWOT analysis provides a framework for understanding the factors affecting an RTC and it encourages strategic thinking. However, identifying the strengths and weaknesses of an RTC and assessing the impact and probability of opportunities and threats often are not as straightforward as first appears. A strength can also show up as a weakness. The SWOT is one of many planning tools that provide a framework a training institution can use.

– An annual plan (sometimes called a business plan or operating plan), which specifies objectives or outputs and actions to be taken by the RTC during the next 12 months to help reach the strategic goals. This plan usually specifies the time-frame, people's responsibilities, and resources (including finance) for each activity or output;

– Project plans, which are associated with specific developments or initiatives that have a specific start and end points. There might also be a programme plan which covers several projects.

Regional Training Centres are not required to prepare strategic plans but are encouraged to do so. They are expected to provide training plans for the following calendar year around December each year. The existence of strategic and annual plans will assist any reviews of the RTC.

4.6.2 Reporting

It is the responsibility of the Permanent Representative to provide the regional association and Secretary-General with an annual report about the activities carried out by the RTC in the previous 12 months and its plans for the next 12 months, with an outlook beyond that.

If an RTC has only one component, it is the responsibility of the Director to prepare a report and submit it to the Permanent Representative.

If an RTC has several components, it is the responsibility of the Director of each component to prepare a report and submit it to the Permanent Representative, with the Coordinator of the RTC overseeing this activity. In that case, the Permanent Representative might delegate responsibility for preparing a consolidated report to the Coordinator of the RTC.

Annual reports will include information about the number of local and foreign participants in the various education and training activities. The education and training opportunities provided

to foreign participants are the key data required to support the reconfirmation of the RTC. The national activity is a useful indicator of whether the training centre is active, but it is the international activity that is directly relevant to the decision of the regional association regarding reconfirmation.

The annual reports are sent to the regional association and the Secretary-General, and provide the means by which the performance of the RTC can be externally monitored. They also provide important information about the extent to which the RTC is meeting the education and training needs identified by the regional association. More information about the use of these reports in the reconfirmation process is given in Box 4.12.

Box 4.12. Use of a Regional Training Centre annual report

- The presidents of the regional associations meet at the beginning of each year. The ETR Office will present the statistics that are known for each Region and what the RTCs plan to offer to the Region.
- Following the meeting of presidents of regional association, the Director of the WMO Education and Training Office (a) provides the presidents with consolidated statistics and updated outlooks for courses for at least the following year and (b) requests them to discuss this information on an intersessional basis with the regional association Management Groups. Each president will be encouraged to engage with the RTCs and provide any updates on the regional association's priority areas. If the regional association meeting is in the following year, the Management Group will be asked to provide the ETR Office with a preliminary assessment of whether RTCs in the Region should be reconfirmed or not, based upon their performance, and whether the RTCs are trying to address the regional association's needs.
- The ETR Office will prepare the ETR paper for a regional association session. This will include the consolidated reports from the RTCs and any other information that may help the regional association decide whether to reconfirm the RTCs or not. This information will include the preliminary assessment from the Management Group, so the reconfirmation is not a decision of the ETR Office.
- Following the session, the ETR Office will provide the EC Panel with the regional association's decisions about the RTCs and the raw statistics, plus any other information on the RTCs for the EC Panel to also consider (possibly on an intersessional basis) whether it supports or not the regional association's recommendation.
- The ETR Office will prepare a paper for the Executive Council or Congress, containing the decisions of the regional association and the EC Panel, and will also prepare a text for the Executive Council to facilitate its decision on whether the RTCs in a particular Region should be reconfirmed for another four years. Sometimes a decision might be taken to delay reconfirmation.
- Following a decision by the Executive Council, the ETR Office will inform the regional association president, the Permanent Representatives hosting RTCs and the RTC Directors regarding the EC decision on designation or reconfirmation.

4.7 POLICIES AND PROCEDURES

It is important for an RTC to have key policies and procedures ensuring that staff and learners know what is expected of them. Besides documenting the admission process, four of the key policies concern plagiarism, copyright, teaching and learning, and assessment.

4.7.1 Admission requirements and process

An RTC must be open to participants from all countries in the Region and, subject to availability of resources, to interested countries in other Regions.

Regional Training Centres set their own admission requirements, though for a university-based RTC these might need to be based on national academic standards. Requirements normally cover academic qualifications, experience, skills and language. An RTC should state its admission requirements along with a full description of the programmes of study.

Concerning the admission process at an RTC, it is expected that:

– Applicants will be considered solely on the basis of their merits, abilities and potential, regardless of gender, ethnic or national origin, disability, religion, sexual orientation or any other irrelevant distinction, though sometimes age might be taken into account;

– The admission process is transparent, fair and consistently applied and is easily understood by the applicants and their managers;

– Everyone involved in the admission process receives training and guidance to enable them to make decisions in a consistent and transparent manner;

– The admission procedure is documented, with clearly defined responsibilities;

– The admission procedure is monitored and regularly reviewed.

Anyone applying for support via the WMO Fellowship Programme requires an admission notice specifying the basis of the admission (unconditional or conditional based upon fulfilling additional language or academic requirements), the course start and end dates and detailed breakdown of costs. As it can take up to six months from the time a fellowship nomination is lodged until the course commences, admission notices must be available up to twelve months ahead of the course dates.

4.7.2 Plagiarism policy

Plagiarism refers to taking someone else's work, words or ideas and presenting them as if they were your own. This means that plagiarism is a form of cheating. Box 4.13 gives some examples of plagiarism.

Box 4.13. Some examples of plagiarism

- Direct copying of text (for example, reproducing material that has been published or is available from the Internet);
- Presenting data or graphics produced by others without acknowledging the source (for example, using downloaded material from the Internet);
- Paraphrasing material produced by others (for example, changing the sentence structure but not the words or changing the words without changing the structure);
- Collusion with others which has not been authorized (for example, work produced by several people working together that is presented as the work of one person).

There is a spectrum of activities that constitute plagiarism, though the management response depends upon whether a specific occurrence of plagiarism is considered to be:

– Intentional, with the aim of deceiving the intended recipient of the material;

– Careless, caused by a lack of understanding of what constitutes plagiarism or ignorance about the referencing or acknowledgement of someone else’s work.

It is desirable for an RTC to have a plagiarism policy that might cover topics such as:

– Definition of plagiarism;

– Examples of plagiarism;

– Guidance about how to avoid plagiarism;

– Use of text comparison software;

– Responsibilities of staff and learners;

– Procedure to be followed when plagiarism occurs.

Whatever is included in the plagiarism policy, the most important aspect is that staff and learners are fully aware that plagiarism is not acceptable, and that there are consequences for anyone indulging in plagiarism.

4.7.3 Copyright policy

It is important that staff and learners at RTCs adhere to national and international copyright law. Consequently, it might be advisable to have a copyright policy emphasizing that staff and learners should be familiar with copyright laws and act in accordance with them. For face-to-face teaching and distance learning, the policy might indicate that:

– People should not use copyrighted material that is not legally made or acquired;

– If it is not known whether some material is lawfully acquired, that material should not be used until its lawful origin can be established.

The policy might also deal in more detail with distance-learning material and cover topics such as:

– Whether course material will only be made available to learners for the duration of a course;

– The controls that will prevent learners from downloading or distributing copyright material;

– The way copyright material will be identified;

– Use of electronic textbooks only in a way that is in agreement with the contract or licence between the intellectual property owner and the user.

4.7.4 Teaching and learning policy

Teaching, learning and assessment are at the core of the activities of an RTC. Consequently, it is desirable to have a policy that covers these topics for the benefit of both the staff and the learners.

For many people the RTC or training institution is their first introduction to the workplace. Thus the RTC and the trainers play a key role in setting the culture and expectations of the workforce. Trainers in particular must be extremely careful to be culturally and gender sensitive (or ensure that they are not culturally or gender insensitive). As noted in section 3.6.2, what can seem small nuances in how trainers address topics or provide feedback can have long-term positive or negative impact upon learning.

Box 4.14 gives an example of a teaching and learning policy. It specifies the overall approach to training, how commitment is shown to learners (though these are referred to as students in the policy) and the actions taken to support continual improvement. A policy such as this would need to be complemented by a list of the responsibilities of trainers and learners.

Box 4.14. Teaching and learning policy at the Bureau of Meteorology Training Centre in Australia

The following points are based on the teaching and learning policy at the Bureau of Meteorology Training Centre in Australia.

Our training will:

- Be focused on the requirements of clients;
- Be based on sound education and training principles;
- Be student-centred, flexible and modular, with clear learning outcomes and expectations;
- Enhance learning through use of appropriate technology;
- Be updated in response to feedback and to changing needs.

We will show commitment to our students by:

- Communicating clear learning outcomes and assessment criteria;
- Ensuring that learning outcomes are congruent with the content of the subject and assessment processes and practices;
- Recognizing prior learning;
- Providing high-quality learning opportunities, with a mix of practical activities and supporting theory;
- Embracing a blended learning approach, including face-to-face, online learning and practical activities;
- Cultivating critical and independent thought in students and developing the capacity for lifelong learning;
- Treating them fairly without gender, racial or other bias and responding to their needs.

We will undertake a process of continual improvement by:

- Ensuring that open and transparent processes are adhered to for all aspects of teaching and assessment;
- Gathering student feedback at the conclusion of each course and each subject unit for larger courses;
- Acting on the student feedback and that of other stakeholders;
- Assessing the effectiveness of the course in meeting the needs of the organizations sponsoring the students.

4.7.5 Assessment policy

An RTC should take a structured approach to assessment with trainers and learners knowing what is expected of them. The key purposes of assessment are:

– Promoting learning;

– Measuring performance;

– Providing feedback to staff and learners.

Box 4.15 describes principles taken from the operating manual of the RTC in South Africa. They could be included in an assessment policy with information about the methods used.

Box 4.15. Assessment principles applied in the Regional Training Centre in South Africa

Care must be taken to ensure that all assessment is designed to be:

Appropriate, so that the method of assessment is suited to the performance being assessed;

Fair, so that the method of assessment does not present any barriers to achievements that are not related to the performance being assessed;

Relevant, valid and focused on the requirements of the unit standard learning activities;

Manageable, so that the methods used make for easily arranged, cost-effective assessments that do not unduly interfere with learning;

Sufficient to collect enough evidence to prove that the learner has achieved the learning outcomes;

Direct and, where possible, integrated into work or learning, by collecting evidence within the work environment (or work simulation) or the learning process, where this is appropriate and feasible;

Authentic, so that the assessor is satisfied that the work being assessed is the work of the person being assessed;

Open, so that the learners understand the assessment process and the criteria that apply;

Consistent, so that the same assessor would make the same judgement again in similar circumstances. The judgement made is similar to the judgement that would be made by other assessors.

(Based on South African Weather Services, 2013: *Operating Manual – Regional Training Centre: Roles, Rules, Regulations and Procedures)*

4.8 THINGS TO CONSIDER

To help you consolidate the material presented in this chapter or check your understanding, try answering the following questions:

Quality assurance, certification and accreditation

- Does your RTC have a quality management system? If so, is it ISO certified? When was the last time it was reviewed and updated?
- Does your RTC have a quality manager? Who is he/she? What is your role in quality management?
- Is your RTC accredited to run courses and, if so, which institution is it accredited with? For which courses? When does the accreditation need to be renewed? What is the process of renewal?

Education and training facilities

- What additional education and training infrastructure could improve the learning potential in your RTC?
- Does your RTC use a Learning Management System? If not, what benefits would there be in implementing such a system?
- To what extent does your RTC have an effective distance-learning infrastructure?

Financial and people management

- How is budgeting and financial monitoring performed within your RTC?
- What, if any, changes can you suggest and adopt for your RTC to take account of the WMO Gender Equality Policy?
- How effective are staff induction and performance management processes in your RTC?

Planning, reporting, policies and procedures

- Is there a strategic plan or annual plan for your RTC and when was it last reviewed? Are you on track to meet the targets in the plan?
- What policies does your RTC have to support learners and the learning process?

5. MANAGING EXTERNAL ACTIVITIES AND RELATIONSHIPS

This chapter covers marketing and promotion of an RTC, resource mobilization and collaboration, particularly with other RTCs, other training institutions serving Members, and WMO bodies and Programmes. It also covers working with the ETR Office and supporting the WMO Fellowship Programme.

As indicated in chapter 1, RTCs are designated on the recommendation of the regional association of the host country, thus the regional association is a key partner. As the RTCs help address aspects of WMO Programmes that are guided by WMO technical commissions and facilitated by the technical departments within the Secretariat, these groups are also addressed in this chapter.

5.1 MARKETING AND PROMOTION

5.1.1 Marketing

The Chartered Institute of Marketing in the United Kingdom has defined marketing as the management process responsible for identifying, anticipating and satisfying customer requirements profitably. This means that marketing consists in more than just promoting the products and services being offered. It also includes what is being offered, how much will be charged for the products and services to be provided and where they are going to be delivered. Originally, these four aspects were known as the 4 Ps of marketing: product, price, place and promotion. Recently, however, three more aspects have been added: people, process and physical evidence. The 7 Ps of marketing are outlined in Box 5.1.

When an RTC is developing a new course, it is worth considering the 7 Ps. Some of the items might not be relevant, but thinking about each one should ensure that nothing of importance is overlooked.

Box 5.1. The "7 Ps" of marketing

The 7 Ps form the "marketing mix" that should be taken into account when developing or providing a service:

Product: What service is being offered and how valuable is it to customers?

Price: How much is charged for the service, who will pay for it and how?

Place: Where is the service delivered?

Promotion: What means are used to inform potential customers of the service and how they might benefit from it?

People: Do the people providing the service have the required expertise and attitude?

Process: Are processes in place for dealing with potential customers?

Physical evidence: Is there evidence that the service is provided in a way that satisfies customers?

Each of these aspects is important; they should be considered together rather than in isolation.

Consideration of the 7 Ps provides input to the development of an RTC marketing plan. There are usually two steps in the preparation of such a plan:

Research: Identify the needs of potential customers, their ability to pay or access funds to pay the training costs (if any) and the extent to which the RTC has the services and resources to satisfy those needs;

Preparation of a marketing plan: Specify the objectives, targets, actions, timescales and resources required for the RTC to carry out its marketing activities and the measures used to assess the successful implementation of the plan.

The marketing plan should answer the following questions:

– Where are we now?

– Where are we going?

– How are we going to get there?

– How will we know whether we have got there?

It is important to avoid going directly to the second question without fully considering the first one. Also the fourth question should not be overlooked. Box 5.2 provides more information about what might be included in a marketing plan.

The marketing plan complements the annual plan described in Section 4.6. In some organizations, the marketing plan is part of the annual plan rather than something separate.

Box 5.2. Possible content of a marketing plan

Business overview: What do we do?

Target market: Whom do we do it for?

Mission: What is our purpose?

External analysis: What is happening in the environment in which we operate and where will the funds come from to cover the cost of the services?

Internal analysis: Where are we now, where are we going and how are we going to get there?

Marketing strategies: What strategies are required to achieve our marketing goals?

Implementation plan: What needs to be done? What actions, by whom and by when?

Monitoring: How will progress in implementing the plan be monitored and how will success be measured?

Resources: What resources are required?

5.1.2 Promotion

Promotion is a way of informing potential customers about what an organization can offer and how they can benefit from it. Regional Training Centres can promote their activities by raising awareness of how they can support their regional associations in implementing their operational plans, and help their client NMHSs achieve their organizational goals. In doing so, RTCs should apply two marketing principles:

Sell benefits, not features: Emphasize the benefits to the individual or organization of participating in a specific learning opportunity (for example, the learning outcomes) rather than just listing features (for example, topics covered);

Identify the unique selling point: Identify what is special about the learning opportunity (for example, that it is linked to a specific scientific or technological development or satisfies professional requirements) or about those responsible for its delivery (for example, the expertise of the trainers).

In addition, any promotional material should be appealing and gain attention, tell a consistent story and be easily understood.

Because RTCs have to attract international participants, there needs to be timely and effective promotion of what is on offer based on sound marketing principles. Promotion informs those that might be able to provide support (for example, Permanent Representatives, regional associations and funding agencies) about the important role played by that RTC.

There are many ways of promoting the activities of an RTC. These include:

– Posting information on its website or listing events on other websites or calendars;

– Distributing promotional material (for example, brochures, folders with inserts, flyers, posters, e-mail announcements and newsletters);

– Maintaining links with past students and regular client countries;

– Using the ETR Focal Point e-mail groups for the Region and contacts with the WMO Regional Offices;

– Arranging for information to be included in the ETR web pages and in the circular letters issued by the Secretary-General;

– Contributing to the Global Campus (see Section 5.7);

– Participating in live events (for example, meetings and conferences).

There are also other techniques such as advertising in publications, direct mailing and sponsoring events, but it is unlikely that these would be practical for most RTCs.

No matter what promotional activities are undertaken, satisfaction of participants in RTC courses is probably the best way of promoting an RTC and its activities. Returning to their NMHS, they tell colleagues and managers what they have experienced, and this information then spreads by word of mouth. Satisfied participants can also be a basis for case studies and testimonials for promotional material. These provide reassurance that the RTC can deliver what is required and meet expectations.

As an example of an innovative approach to promoting an RTC, Box 5.3 describes a post-course video that has been produced in Italy using the testimonials of two course participants. With the video there is a description of the purpose of the course and who might benefit from attending it.

Promotional activities provide a basis for dialogue with potential customers rather than just a one-way conduit for information. Staff within the RTC should be aware of the promotional activities, the benefits of what is being offered and the unique selling point of the RTC. In that way, the staff are able to support the promotional activities when talking to current course participants and communicating with potential customers.

5.2 RESOURCE MOBILIZATION

Resource mobilization is the process of raising different types of support for your organization, usually to undertake development efforts. In this context, resources should be interpreted as covering the following:

Funds: The money available for activities or projects which might come from a variety of sources (for example, government budgets, international development agencies and the private sector);

People: The people needed to design, implement and track activities or projects (for example, volunteers and staff seconded from other organizations);

Goods and services: The goods and services given at reduced cost or free of charge that can support activities and projects (for example, computer equipment, financial or technical advice, training services and places to meet).

Box 5.3. Post-course video from the Regional Training Centre in Italy

The Institute of Biometeorology of the Italian National Research Council (IBMET-CNR), the Italian RTC based in Florence, organized a course titled Seasonal Forecasts and Water Management in the Mediterranean Basin.

A post-course video is available from http://www.cnrweb.tv/seasonal-forecasts-and-water-management-in-the-mediterranean-basin/.This includes contributions from two participants who explained how they expected to benefit from attending the course. The text associated with the video contains a clear description of the course.

Climatic variability and related risks are affecting water availability for different uses, while the demand for water is dramatically rising: knowledge of precipitation and temperature anomalies, made available a few months in advance, could be useful for technical services and organizations managing water resources.

The purpose of this week-long course is to build capacities for seasonal climate forecasts for water management in the Mediterranean countries. Furthermore, in accordance with the Global Framework for Climate Services, the course addresses the need to develop mechanisms for the delivery of climate services to water managers and users, for enabling risk mitigation strategies at various levels and for identifying the demand for research and transfer by end-users.

(Based on Seasonal Forecasts and Water Management in the Mediterranean Basin, WebTV, Consiglio Nazionale delle Ricerche)

Often an RTC needs to attempt resource mobilization to provide new equipment or facilities that will enhance its ability to help NMHSs carry out their mission.

For an RTC to be successful in mobilizing resources, there usually needs to be a compelling case for donors to provide support. The likelihood of achieving this will be enhanced if the RTC has:

– Evidence of past accomplishments and a reputation for delivering outcomes;

– A proposal based on a clear sense of purpose with well-defined outcomes linked to donor priorities;

– An internal management system that ensures accountability, transparency and financial control.

In addition, an RTC should (a) identify potential donors and research their policies, programmes, priorities and procedures, (b) build relationships with potential donors and (c) communicate with potential donors in a manner and language they understand. The most likely donor is often the NMHS of the country hosting the RTC.

Box 5.4 contains information about what might be included in an application for a grant.

Box 5.4. Content of a grant application

An application for a grant might require the following information:

Overview: A summary of the RTC proposal, including the purpose of the project and why funds are requested;

Context: How the project links with the priorities of the donor(s) and the needs of the target countries;

Project description: How the RTC will implement the project, including objectives, activities, timeframes and deliverables;

Monitoring and evaluation: How the RTC will monitor and evaluate the project to ensure that it is on track and achieves what is required;

Budget: Project costs, amount requested, in-kind contributions and other sources of funding;

Organization information: Background information about the RTC (for example, governance, mission, past accomplishments, staff qualifications and internal controls) and whether any other partners are involved.

Within WMO there is the Office for Resource Mobilization and Development Partnerships which focuses on securing development assistance for NMHSs. This assistance can come in the form of financing (either directly or through the Secretariat), transfer of technology and expertise, and leveraging of strategic partnerships with major development partners (for example, development banks, overseas aid agencies, other United Nations agencies and NMHSs in developed countries). This is undertaken in close cooperation with the WMO Regional Offices and WMO Technical Programmes. Information about Resource Mobilization and Development Partnerships is available at https://public.wmo.int/en/our-mandate/what-we-do/capacity-development/resource-mobilization-and-development-partnerships.

Preparing a convincing case usually requires a lot of thought and effort, but this is worthwhile if it leads to a successful outcome. Box 5.5 describes two multi-partner projects that have involved RTCs. Multi-partner proposals can be hard to organize but successful implementation often brings long-term benefits.

5.3 BENEFITS OF COLLABORATION

Collaboration is a general term to describe people working together across organizational boundaries for a specific purpose. These boundaries might be within an organization or between organizations.

No RTC can achieve its full potential by working in isolation. The continued success of an RTC depends on its ability to collaborate with internal stakeholders and external organizations to meet its objectives. There is the potential to increase efficiency and effectiveness by pooling resources, reducing costs and finding better ways of doing things.

Creating and maintaining partnerships can be time consuming but, when done with a clear sense of purpose and the right attitude, can bring enormous benefits to an RTC. The benefits include:

- More course participants;
- Greater range and quality of the activities of an RTC;
- Enhancement of the infrastructure and reputation of an RTC;
- Efficiencies in education and training developments;

– Increased knowledge sharing;

– Stimulation of innovation by providing exposure to different techniques and working practices;

– Strengthened support of those involved in the training process;

– Ensuring sustainability.

Box 5.5. Two examples of multi-partner projects involving Regional Training Centres

Between 2013 and late 2015, the ETR Office partnered with the RTC in Peru, the NMHS of Peru (SENAMHI) and three Swiss organizations (MeteoSwiss, the University of Bern and Meteodat GmbH) on CLIMANDES, a project for Peru. The funding, several million Swiss francs, was provided by the Swiss Agency for Development and Cooperation. The CLIMANDES project consisted of two parts:

- Support of the RTC for the Andean region: Improvement of scientific curriculum, elaboration of e-learning tools and applied training of meteorologists;
- Global Framework for Climate Services (GFCS) twinning: Implementation of data-quality control and homogenization methods, as well as development of climate services for the pilot regions, Cusco and Junín.

In 2017, the ETR Office partnered with the RTC in Italy and AGRHYMET in Niger on a large project with the Italian Ministry of Foreign Affairs and International Cooperation. The project addresses climate change adaptation and disaster risk reduction in agriculture in West Africa. It has two expected results:

- Enhancement of technical and scientific knowledge about climate change adaptation and disaster risk reduction for staff of technical services in countries belonging to the Permanent Inter-State Committee on Drought Control in the Sahel and the Economic Community of West African States (CILSS/ECOWAS);
- Strengthening of the regional network that brings together the community of technical services involved in climate change adaptation and disaster risk reduction, thanks to better collaboration and improved technical and scientific cooperation among NMHSs, other technical services and regional and international institutions.

Partnerships also allow others in the meteorological community to benefit from the considerable education and training expertise that resides within the RTC network.

WMO is committed to partnering with organizations, academia, the media and the private sector to improve the range and quality of critical environmental information and services. This is essential to meet the increasing and changing demands of Members. At the time of writing, the feasibility of a WMO Global Campus, a way of working more collaboratively to help realize the benefits mentioned, is being investigated (see section 5.7).

A range of working relationships can be established between organizations. Consequently, collaboration can come in many different forms depending on the formality of the relationship. Box 5.6 indicates the various types of collaboration that might take place between RTCs.

Collaboration is worthwhile between RTCs or between an RTC and other organizations if there is an alignment of interests and the benefits outweigh the potential costs. To achieve the desired results, the attitude of everyone involved needs to be supportive of collaboration. In particular, for collaboration beyond just sharing information, the partners require:

– A clear purpose and goal that they could not achieve alone;

– Good leadership and individuals who have the ability and motivation to work with others;

- Effective channels of communication;
- A structure and resources that support the development and maintenance of the collaboration;
- A willingness to reach consensus by improvising, being flexible and dealing with differences of opinion in a positive way;
- A commitment to achieving results and finding solutions to complex issues using scarce resources.

Box 5.6. Examples of collaboration between Regional Training Centres

Sharing information

When sharing information, the relationship might be informal, with each of the collaborators having responsibility for its own resources and, to a large extent, working independently. For example, two RTCs might exchange information about their courses and potential course participants and post this information on each other's websites. An RTC might also modify some of its activities taking into account what another RTC is doing. The RTCs sharing information mutually benefit from this exchange by increasing the exposure of what they offer.

Sharing learning resources

Sharing course materials, especially online resources, can make a strong and extended contribution to the professional community. For example, an RTC might benefit from resources shared by other institutions in developing and offering its own new courses. Shared online resources can also help individual learners without access to training and let other institutions benefit from the strengths of an RTC (The Virtual Laboratory (VLab) Centres of Excellence established by WMO and the Coordination Group for Meteorological Satellites (CGMS) have a mandate to share online resources).The payback of sharing resources in a community of institutions, while not immediate as in the case of a strategic collaboration, could be even greater in the long run.

Coordinating activities

Coordinating activities, usually associated with a particular task or project, involves some formality in the relationship and requires a greater investment in time and effort than just sharing information. The collaborators manage their own resources, but they jointly plan the allocation of activities. Good communication channels are needed with some sharing of responsibilities, leadership and control. For example, two RTCs might jointly develop some new training materials they both want and thereby share expertise and avoid duplication of effort. Both RTCs benefit by having new training materials with a reduction in the effort required from each.

Strategic collaboration

Strategic collaboration usually involves long-term projects that require a well-defined formal relationship between the collaborators. Often new structures are required to allow comprehensive planning, a variety of channels of communication and pooling of resources. A higher level of trust, risk-taking and commitment is required than when coordinating activities, but the potential rewards are much greater. For example, RTCs could make a joint application to a funding body for a specific project to enhance their capacities in terms of the range or quality of their courses.

In any collaborative activity, it is worth agreeing what is expected of the partners.

Sometimes, it might be desirable to formalize collaboration between RTCs using a Memorandum of Understanding (MOU). Box 5.7 describes the MOU between the Egyptian Meteorological Authority (EMA) and the Nanjing University of Information Science and Technology (NUIST) concerning their hosting of RTCs.

Box 5.7. Memorandum of Understanding between the Egyptian Meteorological Authority and the Nanjing University of Information Science and Technology

The objective of the MOU is to promote international academic, cultural and scientific exchange between the two institutions. In particular, within the framework of the activities of the RTCs, the objective is to cooperate in supporting education and training in meteorology, hydrology and related fields and raising the awareness and professional skills in meteorology, in particular, for personnel of NMHSs.

The MOU identifies the following as major possible areas of cooperation between EMA and NUIST:

- Exchange information on training requirements of NMHSs, particularly those from developing and least developed countries in Africa and Asia;
- Exchange teaching materials, including those supporting distance and on-line learning;
- Identify means by which programmes of study in meteorology and related fields could be appropriately accredited;
- Exchange instructors for specific training courses;
- Undertake joint activities in research;
- Organize joint academic and training events;
- Exchange training experience by holding regular bilateral meetings.

These activities would take place in close collaboration with the WMO ETRP and within the competence of EMA and NUIST.

5.4 COLLABORATION WITH REGIONAL ASSOCIATIONS

WMO has six regional associations that coordinate meteorological, hydrological and related activities within their respective Regions: Region I (Africa), Regional II (Asia), Region III (South America), Region IV (North America, Central America and the Caribbean), Region V (South-West Pacific) and Region VI (Europe). Information about the regional associations can be found at https://public.wmo.int/en/about-us/governance.

The general terms of reference of regional associations are given in Box 5.8. These indicate that their responsibilities include establishing regional networks and facilities, and promoting cooperation and partnerships. In addition, the regional associations need to identify gaps in technical and institutional capacity and collaborate with Members, technical commissions and other bodies, as necessary, in rectifying critical deficiencies. Regional associations recognize that education and training play a key role in meeting the goals and expected results of their plans. All these aspects could impact on the activities of RTCs.

As described in section 2.6, regional associations have a variety of responsibilities related to the activities of RTCs. These include making recommendations about the designation and reconfirmation of RTCs and monitoring their performance. The RTC designation and reconfirmation process is outlined in section 2.4.

Another responsibility of regional associations concerns prioritizing education and training needs. This involves identifying any education and training gaps that could impact upon successfully achieving the goals and expected results in the regional association's plans. This gap analysis is seen as part of the risk management actions that are based around the Members' need in the high-priority areas, whilst taking into account the existing capabilities of Members and RTCs.

Each regional association has at least one person on the EC Panel who could interface with the Management Group of the regional association to ensure smooth coordination and

Box 5.8. General terms of reference of the regional associations

In carrying out the functions specified in Article 18 (d) of the Convention within the allotted geographical areas defined in this Annex, under the general guidance of Congress and the Executive Council and with support from the Secretariat, each regional association, in close coordination and collaboration with other bodies concerned, shall:

1. Coordinate and organize its Members' activities related to the planning, implementation and evaluation of agreed programmes, strategies and activities, at the regional and subregional levels;
2. Study the technical and institutional capacity-building needs of its Members and subregions, and identify impediments to the timely implementation of planned programmes and activities; collaborate with Members, technical commissions and other bodies, as necessary, to address critical deficiencies;
3. Promote cooperation and efficiency by establishing regional networks and facilities based upon identified regional needs, in close coordination with the technical commissions concerned; monitor the performance of regional networks and facilities and require corrective measures, as necessary;
4. Establish regional operating plans and other implementation plans, as necessary, which address agreed strategic priorities from a regional perspective and ensure the engagement of Members in focused activities aimed at achieving the expected results of the WMO Strategic Plan;
5. Structure its work to address regional priorities and make the best use of the expertise of its Members to provide guidance and assistance, in accordance with the needs of the Region;
6. Build and promote cooperation and partnerships with relevant regional organizations, including the United Nations Regional Economic Commissions, other United Nations bodies, subregional organizations, development partners, non-governmental organization and professional associations;
7. Ensure that WMO is visible and recognized in its Region, and engage stakeholders in regional initiatives and projects related to the strategic priorities of the Organization.

Source: *Basic Documents – No. 1* (WMO-No. 15), 2015 edition, Annex II to the General Regulations

communication between the two bodies. Management Groups are encouraged to nominate one of their members to be the focal point for the ongoing assessment of regional education and training needs against the operational plans and the abilities of the regional training institutes to deliver that training. Box 5.9 describes the potential duties of a regional focal point on human capacity development, derived from terms of reference being developed in Regional Association III (South America).

Box 5.9. Duties of a Regional Focal Point on Human Capacity Development

1. Collect information about the regional needs and priorities in human capacity development;
2. Support the regional association president and Management Group with actions to help identify any education and training gaps that could impede the goals outlined in the current operating plan, as well as expected results;
3. Act as focal point for the designated RTCs with regard to the needs, capabilities and priorities of the training required in the region that the RTCs can deliver;
4. Liaise with the regional member of the EC Panel;
5. Lead the process of defining and implementing a strategic plan for capacity development in the region.

As well as developing good communication channels, RTCs need to:

– Monitor and plan their activities in accordance with the expressed education and training needs of the regional association;

– Promote RTC services and courses through regular communication, and provide easy access to the RTC education and training programme and contact information.

Good relationships between RTCs and their regional associations ensures that (a) RTCs can respond to the education and training needs of the region and (b) regional associations are aware of the activities and capabilities of the RTCs.

5.5 COLLABORATION WITH TECHNICAL COMMISSIONS

WMO has eight technical commissions dealing with aeronautical meteorology, agricultural meteorology, atmospheric sciences, basic systems, climatology, hydrology, instruments and methods of observation, and marine meteorology. They typically provide technical guidance to the WMO Programmes approved by Congress.

The technical commissions are composed of experts designated by Members and are responsible for studying and recommending improvements and standards for meteorological, climatological and hydrological operational systems, applications, services and research. The technical commissions establish methodology and procedures and make recommendations to the Executive Council and Congress. Information about the technical commissions can be found at http://public.wmo.int/en/about-us/governance.

The relationship between RTCs and technical commissions is not well defined because the RTCs generally cover training matters related to several technical commissions. Moreover, the RTCs are products of the regional associations. The technical commissions promote and oversee a wide range of education and training activities, including the definition of competency frameworks. Consequently, RTCs need to be aware of their activities. Competency frameworks developed by the technical commissions should guide the courses offered by the RTC.

Most technical commissions have a member responsible for capacity development (usually the vice-president). Moreover, within the EC Panel there is a member from each technical commission. Regional Training Centres should know who they are so that they can be contacted when needed.

Regional Training Centres are often suitable venues for the technical departments within the WMO Secretariat to hold their education and training events. So RTCs should keep technical departments informed of what can be offered, particularly where an RTC already runs courses linked to the activities of specific technical commissions. This coordination can be managed with the assistance of the ETR Office.

5.6 COLLABORATION WITH WMO PROGRAMMES

WMO carries out its work through scientific and technical Programmes. These are designed to assist all Members in providing, and benefitting from, a wide range of meteorological, climatological and hydrological services and in addressing present and emerging problems. The WMO Programmes are described at http://public.wmo.int/en/programmes.

The ETRP, which is described in Section 1.3, is one of the major WMO Programmes. However, many of the Organization's Programmes include training events run by the technical departments within the Secretariat. Regional Training Centres should monitor the proposed

training activities of Programmes that fall within their areas of expertise and either directly or via the ETR Office coordinate with the technical departments to participate in the delivery of such activities.

Consider, for instance, the WMO Space Programme. One of its strategic goals is to promote the capacity of Members so that they can make wide and meaningful use of satellite data and products, with particular attention being paid to the needs of less advanced countries. The Space Programme organizes or co-sponsors training events in various WMO Regions with the support of members of the CGMS. A key component of the strategy for education and training in satellite meteorology is the WMO-CGMS Virtual Laboratory (VLab) with its network of regional Centres of Excellence and associated Regional Focus Groups. More details about the VLab and the involvement of RTCs can be found in Box 5.10.

Box 5.10. The Virtual Laboratory

The VLab is a global network of specialized training centres and meteorological satellite operators working together to improve the use of data and products from meteorological and environmental satellites throughout WMO Member countries. The objectives of VLab are to:

- Better exploit data from the space-based global observing system for services that are increasingly reliant on satellite data;
- Globally share knowledge, experience, methods and tools related to satellite data, especially in support of Members that have limited resources.

Eight satellite operators are involved in VLab along with thirteen training centres called Centres of Excellence. For more information on VLab go to http://www.wmo-sat.info/vlab/.

The Centres of Excellence, established in all WMO Regions and covering the six official languages of WMO, meet user needs for increased skills and knowledge in the use of satellite data within their Region. They work closely with one or more of the satellite operators and are often co-located with RTCs.

VLab members regularly organize training events and web meetings. Several regional focus groups are organized by the Centres of Excellence to make training events and training resources available to other countries in their Region. The aim is to help forecasters and scientists develop their skills in working with real data without having to leave the workplace.

5.7 THE WMO GLOBAL CAMPUS

Initiatives, such as the Global Framework for Climate Services (GFCS) and those associated with Multi-Hazard Early Warning Systems, have increased the demand for new education and training opportunities. In addition, there is an increased need to support the development of a wide range of management skills. An active RTC network working in collaboration with other training partners is needed to meet these growing requirements.

Whilst there are already some encouraging examples of collaboration and sharing of good practice, more such activities are needed to meet the growing demands. The WMO Global Campus is a proposed framework to help RTCs and other training institutions work together to meet the growing demands for education and training by Members. The focus is on promoting, encouraging and facilitating a proactive approach to collaboration and sharing between RTCs and other training institutions to better serve the Members. This is the rationale for establishing a WMO Global Campus and, if successful, it should strengthen the overall ETR community.

A WMO Global Campus would provide a communication and coordination mechanism to help develop and encourage collaboration and sharing of good practice. This collaboration should help training institutions identify opportunities for developing and delivering training that they cannot provide by themselves.

Contributing to the WMO Global Campus could include offering or using courses, resources and assistance. For institutions involved in the Global Campus, the benefits of a sharing approach include:

– Increased access to a wide variety of learning opportunities;

– Access to new courses developed for specific competencies;

– Increased visibility of the institution's offerings;

– More partners with whom to collaborate for more successful training initiatives.

A WMO Global Campus feasibility study, which started in 2014 and is designed to last about five years, includes demonstration activities and addresses a range of issues including quality assurance, transfer of credits between institutions, language concerns and management of copyright and intellectual property rights (see Box 5.11). Its activities are guided by Resolution 53 (Cg-17) – WMO Global Campus Feasibility Study. The outcome of the study, including a roadmap for future development, will enable the Executive Council in 2018 to make a recommendation to Congress (2019) about whether to implement the WMO Global Campus.

Box 5.11. Feasibility study of the WMO Global Campus

The feasibility study includes three key demonstration activities:

Global searchable catalogue and calendar: Websites that bring together education and training opportunities offered by RTCs and other training institutions to assist Members in identifying education and training opportunities for their staff;

Material supporting competencies in aeronautical meteorology: Further development and delivery of teaching and learning resources for a course or courses supporting the competencies required of aeronautical meteorological personnel. These resources will be available in several languages and will be suitable for face-to-face and online delivery;

Climate services: Identification of courses and resources (existing or under development) that support climate services, are available in multiple languages and are suitable for face-to-face and online delivery; encouraging new initiatives for training development.

In addition, two fundamental needs are being addressed:

- Defining methods for demonstrating the quality of ETR activities and resources;
- Clarifying the WMO Global Campus concept and range of activities.

More information about the Global Campus can be found at http://www.wmo.int/pages/prog/dra/etrp/GlobalCampus.php.

5.8 WORKING WITH THE EDUCATION AND TRAINING OFFICE

5.8.1 Members' needs

Regional Training Centres must work with the regional associations to identify regional learning needs. At the same time, the ETR Office can provide information about learning needs based on details provided by regional associations and technical commissions and the outcome of Member surveys. For example, in 2017, areas in greatest need of further capacity development appear

to be weather forecasting, climate services, observations and instrument maintenance and installation, communications and computing, environmental monitoring, hydrological services, management and administration, aeronautical services, and BIP-M and BIP-MT qualifications.

Regional Training Centres need to be aware of the priority areas identified by the WMO Congress (see Box 5.12) and their regional association. One of these relates to the development and improvement of human resources, and to technical and institutional capacities. This is an area where RTCs can make an important contribution. In addition, some RTCs might already have courses that could contribute to some of the other priorities (for example, disaster risk reduction, climate services, aviation services and marine activities).

Box 5.12. WMO priorities agreed by Congress in 2015

The strategic plan agreed by the Seventeenth World Meteorological Congress outlines priorities for the post-2015 period related to:

- Disaster risk reduction;
- Global Framework for Climate Services;
- Capacity development of NMHSs to develop and improve human resources, technical and institutional capacities, and infrastructure;
- Research and monitoring in polar and high-mountain regions;
- Aviation meteorological services;
- WIGOS and strengthened observing and information systems;
- A more cross-cutting urban focus;
- An increased focus on marine weather activities.

As the demand for weather, water and climate services increases and quality processes demand additional certification and accreditation, it is likely that not all RTCs will be able to address the full range of the high-priority areas identified by Congress or the relevant regional association. In such cases, the RTCs need to interact with the regional association to discuss options for addressing the gaps. These options could include partnerships with other organizations with more expertise in the new areas or identification of regional, or other resources, to allow the RTCs to individually or collectively develop the necessary courses, skills, facilities and personnel.

Within the Secretariat, the ETR Office uses several mechanisms to improve the efficiency and effectiveness of WMO-sponsored and co-sponsored training, through better interdepartmental collaboration and enhanced partnerships with relevant institutions at national, regional and international levels. The aim is to leverage the training programme funds to provide more opportunities for individuals than would otherwise be possible.

Regional Training Centres should be sure to respond to requests for information about their programmes and interests in training for WMO priority areas, and consider guidance on training delivery coming from the Secretariat.

5.8.2 Courses fully sponsored and organized by RTCs and others

The ETR Office works with RTCs and other training institutions to help develop and advertise short-term training courses that are fully sponsored and organized by those institutions. Short-term training courses last from a few days to four weeks.

Most RTCs have the expertise to develop courses to address specific learning needs. However, if a course is aimed at attracting international participants, the ETR Office can offer advice during the development phase. As well as using the expertise of its staff, the ETR Office can advise on similar courses already being run elsewhere.

Through its contacts with technical departments, expert teams, education and training institutions (including RTCs) and NMHSs, the ETR Office might be able to suggest instructors who could participate in a course. The ETR Office might also be able to suggest resources (for example, publications and distance-learning modules) that could be used within the course.

Sometimes WMO shares with Members the announcement of a course. When international participants are included, the ETR Office will want to review the proposed announcement and share it with the relevant technical department for its review. WMO will be looking for consistency with competency frameworks and other guidance material, among other things (see Box 5.13). Once the announcement has been finalized, the ETR Office has a variety of ways of distributing information about RTC courses including:

– Advertising on the ETR web pages;

– Sending e-mails to ETR Focal Points and Directors of RTCs;

– Issuing circular letters to Permanent Representatives of targeted countries (though this is usually only done for courses co-sponsored by WMO).

Overall, making contact with the ETR Office at an early stage might result in a course that is attractive to international participants, takes advantage of what is already available in other institutions and is widely advertised using a variety of communication channels.

Box 5.13. Information to be provided when requesting the support of WMO

The following points outline important information to be provided when requesting the support and guidance of WMO:

- Title of course;
- Dates and location of course;
- Course description;
- Expected learning outcomes;
- Target audience and qualifications;
- Course content;
- Pre- and post-course content, activities or assessment;
- Course format;
- Student assessment;
- Instructor's name and qualifications;
- Language used;
- Application and selection process;
- Costs;
- Deadline for application.

Details can be found in Template for course information or enrolment information forms at https://www.wmo.int/pages/prog/dra/etrp/ProcessesforOfferingTrainingCourses.php.

5.8.3 Courses co-sponsored or sponsored by WMO

As well as providing advice and advertising courses fully sponsored and organized by other institutions, WMO can contribute to courses in the following ways:

– Many short-term courses are co-sponsored. For these, WMO both advertises the courses and contributes some support for participants or experts;

– In a very few cases, WMO fully organizes and sponsors events for specific Member audiences (for example, the ETR Office periodically organizes symposia and workshops for trainers, training centre directors and managers of NMHSs), which may or may not be hosted by RTCs or other training institutions.

Some course offerings are highly specialized and participants are limited to those invited by the organizers. Other offerings are open to all Members and are conveyed via a circular letter from the Secretary-General.

For many open offerings, the course organizers waive or reduce tuition fees and/or provide low cost or free accommodation and meals to all or a portion of the participants – for example, those from least developed countries or small island developing States. For training courses advertised through WMO, Members are expected to provide full support for the learners they nominate, including travel expenses. However, through voluntary funding made available by some Members, the ETRP can sometimes financially support a limited number of students. Members with the greatest needs are given priority for funding. In addition, it is expected that:

– Requests for funding are for high-priority training needs based on an institution's plans and requirements;

– Efforts are made to use internal and/or external funding before a request for funding is submitted to WMO;

– Requests for financial support are signed by the Permanent Representative of the nominating country, or the person(s) whom they have designated to sign on their behalf. Requests for financial assistance not signed by the Permanent Representative are invalid;

– Nominees meet all the course entry requirements.

Participants for courses are selected by the course organizers, in consultation with WMO, on the basis of the announced course selection criteria, which often include qualifications (possessing the minimum academic and language skills to benefit from the course) and current job duties (ability and need to apply what is learned). Participants must be accepted by the course organizers before they can apply for financial support from WMO (see Box 5.14 for more information).

5.8.4 Moodle platform

Moodle (Modular Object-Oriented Dynamic Learning Environment) is a free open-source LMS or e-learning platform that serves educators and learners across the globe. The ETR Office maintains a Moodle platform (http://etrp.wmo.int/moodle/) to support the meetings and events organized by the ETR Office. When requested, the ETR Office may provide support to the WMO technical departments for their events and training activities.

The ETR Moodle platform is used to deliver the WMO Online Course for Trainers (see Box 5.15). In addition, it provides resources for trainers based on the material included in the online courses; these resources complement what is covered in *Guidelines for Trainers*. The material is primarily for independent use, but it also provides a discussion forum for sharing questions, advice and training experiences.

Regional Training Centres are encouraged to adopt Moodle as an LMS and use it for their on-site courses or as a platform for distance-learning courses. The ETR Moodle platform could be used as a place to gain experience using Moodle with the support of the ETR Office. Once RTCs have decided to adopt Moodle, they should try to install their own version or share one with a partner institution. Installation of Moodle is easy and online guidance is readily available. It is not possible for the ETR Moodle platform to host all the RTC courses.

Box 5.14. The decision-making process and financial support

Decisions on the ability of WMO to offer support are based on relative need, relevance of the course to the learner, demonstrated value of the course to the Member and the amount of support available. WMO also considers the number of recent funding requests granted to the Member making the request and requirements for geographic and gender balance.

To achieve fairness, generally WMO can support only one nominee from a Member for any particular course. If more than one nomination is made, the Permanent Representative must explicitly state which nomination should receive priority and whether any cost sharing is proposed. If cost sharing is proposed, it may be possible, from time to time, to support more than one participant provided the total cost is no more than full travel support for one person.

All requests for financial support must be received by the Secretary-General of WMO no later than four weeks before the course begins, or immediately after the participant has been accepted, whichever is earlier.

Unless explicitly stated otherwise, WMO support will be limited to provision of airfare according to WMO travel policy. Participants or their organizations are expected to pay incidental expenses unless provided by the host country. Participants should also have funds with them to cover minor expenses or unexpected delay during travel. WMO does not cover the cost of obtaining a visa.

For more information about how to nominate someone for a short-term course, visit the following Web page: https://www.wmo.int/pages/prog/dra/etrp/CourseNominationGuidelines.php.

Furthermore, WMO and the UK Met Office College maintain an e-learning Moodle site which gives Members access to additional online resources for training in meteorology, hydrology and associated sciences.

5.8.5 Other advice and support

The ETR Office provides information that supports education and training activities at RTCs and other institutions. For example, the following information can be found in the ETRP pages on the WMO website:

Publications released by the ETR Office: These include publications concerned with careers in meteorology, the designation and reconfirmation of RTCs, guidelines for trainers, WMO fellowships, competency requirements for education and training providers, and education and training standards such as those set out in the BIP-M and BIP-MT;

Strategy for public education and outreach: This emphasizes the benefits of encouraging and facilitating the production, distribution and use of public education material;

Box 5.15. The WMO online courses for trainers

The ETR Office organizes online courses for trainers based on the WMO Competency Requirements for Education and Training Providers, as approved by the Executive Council in 2013. These are followed by residency workshops mostly focused on the development and implementation of projects.

The aim is to help national and regional meteorological and hydrological trainers and training managers increase their knowledge and skills in planning, developing, delivering, assessing and evaluating learning activities. The knowledge and skills gained contribute to the achievement of the WMO competency requirements.

Staff members of RTCs are urged to participate in these online courses and workshops.

BIP-M compliance: This provides a flow chart that indicates the correct version of the BIP-M to be used to ensure that Aeronautical Meteorological Forecasters comply with the qualification requirements. It also identifies the actions to be taken to demonstrate compliance;

Distance-learning resources: Links are provided to a variety of distance-learning resources, including those from the COMET programme, EUMETSAT, EUMeTrain – the international training project sponsored by EUMETSAT – and VLab. There is also a link to resources provided by the Expert Team on Education, Training and Competency of the Commission for Aeronautical Meteorology.

5.9 SUPPORTING THE WMO FELLOWSHIP PROGRAMME

5.9.1 Awarding and funding of fellowships

The Fellowship Programme, as updated by the Executive Council in 2014, aims to support the education and training of qualified and suitable candidates, particularly from developing and least developed countries and small island developing States. Gender is taken into account and applications from women are encouraged. Fellowships should benefit both the individual candidate and the candidate's institution, usually the NMHSs.

Each year, normally in September or October, the Secretary-General circulates a letter to all Members apprising them of the fellowship opportunities for the coming calendar year. This letter outlines specific offerings that address high-priority areas or have strong partnership elements that reduce the cost of general fellowships. Regional Training Centres are encouraged to coordinate with the Chief of the Education and Fellowship Division of the ETR Office regarding specific courses they can contribute, which will be included in the Secretary-General's annual letter.

Fellowships are mainly for study abroad in subject areas and technologies for which facilities and teaching expertise are not available at home. The fellowship categories include basic university degree, post-graduate degree, non-degree studies, specialized training courses, on-the-job training, as well as technical training for the operation and maintenance of equipment. WMO may award both short-term (less than six months) and long-term (6 months or longer) fellowships. Furthermore, group training of up to one month may be awarded. Box 5.16 outlines how fellowships are funded.

Box 5.16. Funding of fellowships

WMO grants fellowships under the following funding mechanisms:

- The regular budget of WMO;
- Projects financed by development partners;
- The WMO Voluntary Cooperation Programme;
- Cost sharing with development partners;
- Projects financed through trust funds.

Members may also be able to access fellowships via:

- Bilateral assistance programmes;
- Technical cooperation programmes with developing countries;
- The private sector and other agencies for fellowships;
- Funding mechanisms established for environment-related conventions.

These should be explored at the national level through offices of the United Nations Development Programme (UNDP), national planning offices, representatives of donor countries, the private sector and development banks.

In principle, a fellowship can be awarded for study at any institution that meets the specific needs of an individual. However, there are two groups of institutions that are particularly suitable:

– Regional Training Centres which often either waive or reduce tuition fees and financially assist foreign students;

– Institutions with which WMO has signed an MOU covering special concessions for the co-sponsoring of WMO fellows.

Priority will be given to fellowships for studying at RTCs.

It should be noted that:

– The training objectives associated with a fellowship application should be aligned with the priorities of the ETRP. In addition, they should dovetail with national development plans, fall within the WMO mandate and be useful to the international meteorological community;

– Fellowships constitute an integral part of each WMO scientific programme, so the planning and management of fellowships are closely coordinated with the staff involved in the various WMO scientific programmes.

Box 5.17 indicates the criteria used for fellowship selection. In addition to the WMO requirements, the university or institution where the fellow intends to study might have its own conditions in terms of academic and language requirements and age limits. These are not WMO conditions – rather they are the conditions of the hosting country and cannot be modified.

Box 5.17. Awarding of fellowships by WMO

In awarding a fellowship, preference will be given to candidates who:

- Come from NMHSs of developing and least developed countries, countries with economies in transition and countries more vulnerable to natural disasters;
- Are supported by cost sharing;
- Apply for courses at RTCs or other training institutions in their Region;
- Apply for short-term fellowships or long-term fellowships not exceeding 18 months in duration;
- Are expected to work and make a long-term contribution in the NMHS of their country in a suitable post on completion of the fellowship;
- Have not been awarded a long-term WMO fellowship within the previous four years;
- Come from a country that has not recently benefited from a WMO fellowship.

Moreover, in awarding a fellowship, account will be taken of:

- The need for regional proportional balance;
- The need to apply equal opportunity policies (see Resolution 33 (Cg-XIV) – Equal opportunities for the participation of women in meteorology and hydrology);
- Whether the Permanent Representative of the candidates' country has provided WMO with the required report of any previous fellowship.

More information can be found in *Guidelines for Applying for a WMO Fellowship* (WMO-No 1104) also available at https://public.wmo.int/en/resources/training/fellowships. This site also provides information about forms and fellowship opportunities.

All institutions where a fellow is studying are expected to deliver a course that meets the published learning outcomes and to have suitable services in place to support international students. There are also obligations on fellows as outlined in Box 5.18.

Box 5.18. Obligations of WMO fellows

Fellows are obliged to:

- Conduct themselves at all times in a manner consistent with their status as holders of an international fellowship and as representatives of their country;
- Carry out their studies within the period prescribed by WMO;
- Refrain from engaging in political activities;
- Submit reports as required by WMO;
- Return to their home country at the end of their award.

Engagement in political activities or occurrences of serious misconduct and dishonesty will result in the termination of their award and immediate return to their home country.

Furthermore, to prepare for a fellowship candidates are expected to:

- Obtain their own passports and visas, including transit visas, which may be necessary to travel from the home country to the country or countries of study and for the return journey;
- Have valid academic credentials that are internationally recognized;
- Be of good health certified by a duly qualified physician;
- Have clothing suited to the climate of the host country (an allowance for clothing is only available for study in the Russian Federation);
- Be confident that they can study in a multicultural environment;
- Carefully consider the consequences of a long separation from home country and family.

The success of the WMO Fellowship Programme is due to the strength and diversity of partnerships involving RTCs, universities with which there is an MOU, and NMHSs and institutions providing work placements.

5.9.2 Role of Regional Training Centres in supporting fellowships

Regional Training Centres, as well as being the preferred location for fellows to undertake study, can also contribute to the Fellowship Programme by supporting the application process and the implementation of a fellowship:

– A request for a fellowship is made using a Fellowship Nomination Form (FNF). Specific application documents (for example, a provisional letter of admission from the institution) must be submitted with the FNF to be able to study in most institutions. By providing an application document promptly, an RTC expedites the application process;

– Preference is given to placing fellows at institutions where there is some cost sharing. Consequently, it is desirable that RTCs consider waiving tuition fees or identify sources of funding. Providing accommodation or reimbursing travel costs is another form of cost sharing;

– Taking up a fellowship can be stressful, especially if this involves going to another country. It would, therefore, be helpful if the RTC provided a fellow, before his/her departure, with advice about topics such as visas, travel, accommodation, food and cultural norms. On arrival, orientation sessions would help the fellow settle into the new surroundings and ways of doing things;

– Even if a fellow goes through a well-structured orientation process, it is likely that there will still be concerns, especially at the beginning of the fellowship. Having a specific person

within the RTC who can be a source of advice and support will help deal with problems before they become serious. It might help if fellows are encouraged to share their thoughts and experiences by joining the WMO Fellowship Forum;

– Regional Training Centres are required to submit annual academic progress reports on fellows spending more than one academic year at their institution. The report is required only for continuing fellowships. Progress reports should include (a) information about the fellow's academic performance and conduct, and (b) a critical evaluation of the fellow's training programme. Providing prompt reports will ensure that there is no interruption of the fellowship.

Regional Training Centres could also share good practice in looking after fellows so that they get full benefit from their fellowship.

5.10 THINGS TO CONSIDER

To help you consolidate the material presented in this chapter or check your understanding, try answering the following questions.

Marketing and promotion

– Does your RTC take a systematic approach to marketing its activities?

– How does your RTC promote its activities? Who are the main targets? What new promotional activities could be undertaken?

Resource mobilization and partnerships

– What is the main need of your RTC that could be addressed by mobilizing resources and how might you go about addressing that need?

– With which organizations does your RTC collaborate and what is the nature of that collaboration?

Collaborative activities

– How does your RTC keep abreast of, and contribute to, the activities of regional associations, technical commissions and WMO Programmes?

– In what ways might your RTC benefit from contributing to a WMO Global Campus or using resources provided by others?

– When developing courses, to what extent does your RTC take into account the priority areas decided by WMO Congress?

Working with the Education and Training Office

– What courses run by your RTC are co-sponsored or sponsored by WMO?

– What use does your RTC make of the information available via the website dedicated to supporting the ETRP?

WMO Fellowship Programme

– How does your RTC ensure that WMO fellows get full benefit from attending your RTC?

APPENDIX. USING SURVEYS OR FORUMS TO ASSESS REGIONAL TRAINING NEEDS

A team will need to be established to visit the NMHS of each country to interview managers and forecasters and staff of the Regional Training Centres (RTCs) in order to determine their current priorities and resource allocations. If travelling in person is not feasible, an alternative approach is to mix in-person interviews with online surveys and conference call interviews. The data from the interviews should be analysed to determine the training needs of specific countries and potential shared needs across countries. After the analysis a final report can be prepared and shared with the regional association.

Questions for managers

- What do you see as the most critical performance issues for your forecasters?
- What specific things would you like the forecasters to do that they are not doing at present?
- What specific things are the forecasters doing that they should not be doing?
- When you envision forecasters performing this job properly, what do you see them doing?
- What subject would you like your forecasters to learn more about?
- What would you like to learn more about?

Questions for forecasters

- What do you find most challenging about preparing forecasts?
- What prevents you from performing a prescribed forecasting task to current standards?
- Are job aids available and if so, are they accurate and are they being used?
- Are the standards reasonable? If not, why?
- If you could change one thing in the way you perform your work, what would it be?
- What new tool or technology would benefit you the most in the performance of your work?

Questions for Regional Training Centres

- What are your current top training priorities?
- How are you delivering training courses for those priorities?
- How many trainers are currently working on these priorities?
- How many sessions does each trainer carry out?
- How many forecasters have completed the training courses for these priorities?
- What are your current training offerings?

Questions could also be asked about specific services such as those concerned with aviation or tropical cyclones.

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